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Contents

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Front cover: A Dung fly (possibly the Yellow Dung Fly *Scathophaga stercorea*) assaulting a hoverfly. Photographed on the YNU Excursion to Aysgarth Freeholders' & St. John's Wood-Riddings Field (VC65) by Ken White.

Back cover: YNU members in a colourful field on the Excursion to Eastrinton Ponds (VC61). Photo: Ken White

Yorkshire Naturalists' Union

c/o NEYEDC, 10a Minster Gates, York YO1 7HL
Tel: 01904 641631 Email: membership@ynu.org.uk
Website: www.ynu.org.uk
Registered Charity No. 224018

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Freshwater plants and SSSI canals in the East Midlands and North of England 4: an overview

R. Goulder 5 Bishops Croft, Beverley HU17 8JY
Email: r.goulder@hull.ac.uk

Previous articles have addressed freshwater plants in seven canal SSSIs in the East Midlands and North of England (Goulder, 2016, 2017a, 2017b). The canals studied were the Leeds & Liverpool, Huddersfield Narrow, Chesterfield, Cromford, Grantham, Leven and Pocklington (see Plate 1, centre pages). This fourth article aims to consider the sites together and to give an overview.

The range of aquatic plants recorded in the canal SSSIs

Only plants on the JNCC (2005) *Common Standards Monitoring Guidance for Canals* checklists for native aquatic plants and non-native aquatic vascular plants were routinely recorded; survey was largely in summer 2015 but with some records from 2013. Nomenclature follows Stace (2010); scientific names are given in the text only if they do not appear in the tables (pp173-6).

In all, 71 aquatic plants were recorded in the seven canal SSSIs (Tables 1 & 2, pages 173-4). Thirty-three of these were mostly found as submerged or floating-leaved plants and 38 as mostly emergent plants although the distinction was sometimes somewhat arbitrary. Some plants at some sites were largely submerged or floating while at other sites they tended to be emergent; obvious examples of these were Amphibious Bistort, Arrowhead and Unbranched Bur-reed. Four of the plants recorded were non-native: Sweet-flag, New Zealand Pigmyweed, Canadian Waterweed and Nuttall's Waterweed.

There was considerable variation in species richness between the seven SSSIs. The number of submerged and floating-leaved plants recorded was as few as five in the Huddersfield Narrow Canal, and otherwise ranged from 11 in the Chesterfield Canal to 17 in both the Cromford Canal and the Leven Canal (Table 3, page 175). There was less variation in the number of emergent plants, which ranged from 17 in the Chesterfield Canal to 22 in the Cromford Canal and Grantham Canal (Table 3). Species richness of all aquatic plants ranged from 23 in the Huddersfield Narrow Canal, 28 in the Chesterfield Canal, 31 in the Pocklington Canal, 34 in the Grantham Canal, 35 in the Leeds & Liverpool Canal, 38 in the Leven Canal and 39 in the

Cromford Canal.
Amongst submerged and floating-leaved plants (Table 1) Common Duckweed was found at all seven canal SSSIs; it is also likely that the alien Least Duckweed *Lemna minuta* was present at some sites but it was not recorded separately. Ivy-leaved Duckweed, Curled Pondweed and Fennel Pondweed were found at six of the seven SSSIs while stonewort and Unbranched Bur-reed were at five of them. Thirteen plants were, however, recorded at only one of the SSSIs. Eight pondweeds (*Potamogeton*) were recorded; three of these (Small Pondweed, Shining Pondweed and Lesser Pondweed) were each found at only two of the SSSIs while Perfoliate Pondweed and Hairlike Pondweed were found only in the Leeds & Liverpool Canal.

Emergent plants were more ubiquitous (Table 2). Reed Sweet-grass was much the most abundant plant and was found at all seven SSSIs, although only sparingly in the Huddersfield Narrow Canal; there were also five other emergent plants that were recorded at all the SSSIs: Creeping Bent, Yellow Iris, Reed Canary-grass, Branched Bur-reed and Bulrush. Four plants were found at six of the seven sites; these were Lesser Water-parsnip, Water Mint, Amphibious Bistort and Bittersweet. Ten emergent plants were recorded at only one of the sites.

Discussion and overview
Although the seven canal SSSIs that were studied are all to a large degree considered to be in an unfavourable condition by Natural England (Goulder, 2016), this should by no means lead to the conclusion that they have lost most or all of the botanical features for which they were originally notified as SSSIs. The monitoring of canal SSSIs by Natural England follows a broad approach in which the quality of the site is assessed against a range of set criteria. These include the quantity and species richness of aquatic plants but also other attributes amongst which are, for example: habitat function in terms of water availability, transparency and chemistry; habitat structure in the context of depth and texture of sediment and extent of shading; indicators of negative change such as the appearance of alien plants; local criteria such as the persistence of rare plants or unusual plant communities. If a site fails on any one of these criteria then its condition is classed as unfavourable (JNCC, 2005).

The wide range of aquatic plants that were recorded in the seven canal SSSIs emphasizes their substantial value as a botanical resource; the 33 submerged or floating-leaved plants (Table 1) and 38 emergent plants (Table 2) that were found included 46% of all the native aquatic plants that feature on the JNCC (2005) checklist as liable to be found in UK canals. Some plants, that were found at more or less all of the SSSIs surveyed, are widespread in and characteristic of English canals. This group included the submerged/floating-leaved Common Duckweed, Ivy-leaved Duckweed, Curled Pondweed and Fennel Pondweed and emergent Reed Sweet-grass, Yellow Iris, Reed Canary-grass, Branched Bur-reed and Bulrush. Pondweeds (*Potamogeton*) often featured in citations when the SSSIs were notified (Natural England, 2016) and it is encouraging that altogether eight pondweeds were recorded in 2013/2015, although there were very notable differences between sites in the number found; from two species in the Grantham, Huddersfield Narrow and Leven canals to six in the Leeds & Liverpool Canal (Table 1). Some plants were of special conservation interest; there were nationally and locally rare/scarce plants and many that are loosely definable as 'axiophytes', that is 'worthy plants' that rouse the interest of botanists and conservationists when encountered and tend to indicate promising sites for conservation or restoration (BSBI, 2016). Designation of plants as axiophytes

to a degree depends upon personal preference and experience but examples of submerged/ floating-leaved plants that may be fitted into this group included Mare's-tail, Water-violet, Frogbit, Whorled Water-milfoil, White Water-lily when native, Small Pondweed, Shining Pondweed, Perfoliate Pondweed, Lesser Pondweed, Hairlike Pondweed, Fan-leaved Water-crowfoot, Floating Crystalwort, Greater Duckweed, Water-soldier and Greater Bladderwort. Most of these occurred at only one or two of the SSSIs visited. Amongst emergent plants the equivalents were perhaps Flowering-rush, Tufted-sedge, Cyperus Sedge, Bottle Sedge, Hemlock Water-dropwort, Tubular Water-dropwort, Lesser Spearwort, Greater Spearwort, Great Yellow-cress, Water Dock, Common Club-rush, Greater Water-parsnip and Lesser Bulrush.

Notwithstanding the evident continuing botanical conservation value of the seven SSSIs, it was apparent in 2013/2015 that there were clear differences in the merits of the different sites and that some have fared worse than others since their notification as SSSIs. Submerged and floating-leaved plants and their communities in general terms appear to have been more vulnerable than emergent plants. This vulnerability is well illustrated by the apparent losses of pondweeds; the number of *Potamogeton* species recorded previously but seemingly lost by 2013/2015 were seven from the Huddersfield Narrow Canal, four from each of the Grantham and Leven canals, three from each of the Chesterfield, Cromford and Pocklington canals, and two from the Leeds & Liverpool Canal (Goulder, 2016, 2017a, 2017b).

Submerged and floating-leaved plants fared better in some canals than in others. The number present may be regarded as a very rough indicator of botanical worth. On this criterion the best sites in 2013/2015 were the Cromford Canal and the Leven Canal, both with seventeen submerged/floating-leaved plants, and the Leeds & Liverpool Canal with fifteen; the poorest by far was the Huddersfield Narrow Canal with only five (Table 3). A more nuanced assessment of botanical worth is perhaps, however, given by the mean values for number of species (*n*) and sum of abundance scores ($\sum AS$) for the canal lengths recorded (Table 3), although it should be noted that these were not necessarily of the same length in all canals. Using these criteria the best sites were the Leeds & Liverpool Canal (mean *n* of submerged/floating-leaved plants per length surveyed = 9.5, mean $\sum AS$ = 15.6) and the Leven Canal (mean *n* = 8.6, mean $\sum AS$ = 15.8) which contrasted sharply with the Huddersfield Narrow Canal (mean *n* = 0.6, mean $\sum AS$ = 0.6). The Chesterfield, Cromford, Grantham and Pocklington canals fell between these extremes (mean *n* ranged from 3.8-5.8 and mean $\sum AS$ from 6.7-11.7).

The total number of species of emergent plants recorded did not vary hugely between the seven SSSIs; the range was from 17 in the Chesterfield Canal to 22 in the Cromford Canal and Grantham Canal (Table 3). More variation between sites was, however, shown by the mean number of emergent plants per canal length (Table 3); mean *n* per length was low in the Huddersfield Narrow Canal at 6.1, the Pocklington Canal at 7.7 and the Cromford Canal at 8.3 per length while for the other canals it increased from 9.8 in the Leeds & Liverpool Canal to 10.9 in the Chesterfield Canal, 12.0 in the Grantham Canal and 12.8 in the Leven Canal. Also revealing were values of mean $\sum AS$ per length (Table 3); low values of 8.1 in the Huddersfield Narrow Canal increased to 12.1 in the Cromford Canal, 12.9 in the Leeds & Liverpool Canal, 17.1 in the Chesterfield Canal, 21.0 in the Grantham Canal and 22.8 in the Leven Canal.

The number of seemingly lost plants since notification or since subsequent surveys (Table 4, p176) is perhaps also indicative of the status of the sites; the healthier sites having lost fewer

species. Thus the Cromford, Grantham, Leeds & Liverpool and Leven canals had seemingly lost six to eight submerged and floating-leaved plants, the Chesterfield Canal ten, the Pocklington Canal 17 and the Huddersfield Narrow Canal 20. Emergent plants seemed to be more resilient than submerged and floating-leaved ones. Thus there was less variation in the number of seemingly lost emergent plants (Table 4): the range was six from the Leeds & Liverpool Canal to seven from the Grantham Canal, eight from the Cromford Canal, ten from the Huddersfield Narrow Canal and 11 from the Chesterfield, Leven and Pocklington canals.

It is emphasized, however, that it is likely that some of the seemingly lost plants were still there but for several reasons were missed during the 2013/2015 surveys. (1) A grapnel was not always used, in which case the recording of submerged plants depended upon them being visible underwater, having grown to reach the surface or there being detached, floating fragments. (2) When there was head-high, dense marginal vegetation, for example stands of Common Reed along the Grantham, Leven and Pocklington canals, low-growing emergent plants within or beyond the stands might easily have been missed. (3) Recording was often limited to a single visit between May and September; some plants are more conspicuous and more likely to be recorded early in this period, others are more likely to be seen later. (4) Emergent plants on the far side of canals were not always recognizable notwithstanding the use of binoculars. (5) In some canals only part of the SSSI was surveyed; 23% on the Chesterfield Canal, 52% on the Pocklington Canal and 86% on the Grantham Canal.

That some plants will have been overlooked provides a challenge for future recorders but it is nevertheless certain that some of the losses since notification are real. The significance of the loss of a particular plant from a conservation viewpoint varies very much from species to species. The most important losses were those of nationally, or at least locally, rare or scarce plants. Examples amongst these of submerged/floating-leaved plants were: Linton's Pondweed *Potamogeton xlintonii* and Brackish Water-crowfoot *Ranunculus baudotii* from the Chesterfield Canal; Soft Hornwort *Ceratophyllum submersum* from the Cromford Canal and the Pocklington Canal; Grass-wrack Pondweed *Potamogeton compressus* from the Cromford Canal and Huddersfield Narrow Canal; Various-leaved Pondweed *Potamogeton gramineus* from the Cromford Canal; Flat-stalked Pondweed *Potamogeton friesii* from the Grantham, Leven and Pocklington canals; Blunt-leaved Pondweed *Potamogeton obtusifolius* from the Grantham Canal and Leeds & Liverpool Canal; Water-violet, Floating Water-plantain *Luronium natans*, Long-stalked Pondweed *Potamogeton praelongus*, Hairlike Pondweed and Greater Duckweed from the Huddersfield Narrow Canal; Lesser Marshwort *Apium inundatum* and Red Pondweed *Potamogeton alpinus* from the Leven Canal; Opposite-leaved Pondweed *Groenlandia densa* from the Pocklington Canal. Equivalent losses amongst emergent plants were fewer, examples included: Greater Spearwort from the Chesterfield Canal; Narrow-leaved Water-plantain *Alisma lanceolatum* from the Cromford, Grantham, Leven and Pocklington canals; Tubular Water-dropwort from the Grantham Canal; Lesser Water-plantain *Baldellia ranunculoides* from the Pocklington Canal. In addition there were many apparent losses of both axiophytes and less notable aquatic plants; some of these are widespread and often abundant elsewhere but nevertheless their loss represented significant decrease in the richness of the aquatic plant communities. Some apparent losses are, however, less regrettable; notably the alien plants Water Fern *Azolla filiculoides*, Canadian Waterweed and Nuttall's Waterweed which were no longer recorded in some of the canals (Goulder, 2016, 2017a, 2017b).

It is not necessarily obvious, from field observations made while walking the towing paths, why some of the SSSIs continue to be better aquatic-plant habitats than others, and why some have lost more species. Nevertheless some discussion of likely causes is possible.

1. Shading by trees. It is very evident that the distribution of aquatic plants was in many places restricted by lack of light caused by tree shading; this applied to both submerged/floating-leaved and emergent communities. Both shaded and open areas were to be seen along some of the canals surveyed, resulting in less plant abundance and diversity in lengths with deep shade. An example of this was in the Cromford Canal (Goulder, 2017a) where much of the 1.3km of Length 11 was heavily tree-shaded and where the only dominant/abundant plants were Fan-leaved Water-crowfoot and Reed Sweet-grass and these were found at the less-shaded extremities of the length. In contrast the 0.5km of the adjacent Length 10 was less shaded and had Canadian Waterweed, Nuttall's Waterweed, Spiked Water-milfoil, Broad-leaved Pondweed and Fan-leaved Water-crowfoot as dominant/abundant plants. Similarly in the Leeds & Liverpool Canal (Goulder, 2016) the deeply-shaded 0.9km of Length 5 had only Nuttall's Waterweed and Arrowhead as dominant or abundant plants whereas the less-shaded adjacent 0.8km of Length 6 had Nuttall's Waterweed, Arrowhead, Flowering-rush, Reed Sweet-grass and Bulrush as dominant/abundant plants. Also, it was especially noticeable along the Leeds & Liverpool Canal that Perfoliate Pondweed thrived only in unshaded areas. It is possible that some losses of aquatic plants from the SSSIs studied were related to increase in tree cover since notification. In this context it was observed that management at many of the sites has included a degree of tree removal; that is from the Cromford, Leeds & Liverpool, Leven and Pocklington canals. Significant and substantial removal of canal-side trees is, however, generally not a feasible option; cost is an obvious reason but there tend also to be other constraints imposed by issues of wildlife conservation, aesthetics and public opinion. This is especially so where canals follow wooded valley sides, for example parts of the Cromford Canal and Leeds & Liverpool Canal. It is also likely that some of the canal-side woodlands that shaded the sites are long established and hence not related to recent losses; for example historic OS maps from the 1890s, 1900s, 1930s and 1960s (Edina Digimap, 2016) suggest that the woodland on the south side of the Leeds & Liverpool Canal that shades Length 5, an area that was extensively quarried in the 19th century, is a long-standing landscape feature. It is also likely that at sites where there was a mosaic of heavy tree-shade, moderate shade and open areas the diversity of light climate tended to favour high species richness; this was perhaps the case along much of the Cromford Canal, for example the 1.3 km of Length 3 along which 19 JNCC checklist species were recorded.

2. Inter-specific competition. Vigorous submerged or floating-leaved plants appeared at some sites to outcompete other potential members of this community, leading to high biomass but species-poor stands. This was exemplified in the Grantham Canal where dense stands of Rigid Hornwort and/or Water-soldier occupied canal lengths that were otherwise poor in submerged plants (Goulder, 2017a); thus, apart from these dominant plants and duckweeds, the 0.5km Lengths 5, 7 and 12 had no other submerged or floating-leaved plants. Similarly, dense stands of emergent marginal vegetation were sometimes more or less monospecific with the dominant plant out-competing all others; for example, Length 2 in the Pocklington Canal in 2013 (Goulder, 2017b) had extensive Reed Sweet-grass while occasional/rare Creeping Bent and Bittersweet were the only other emergent

plants recorded. Some of the plants with the potential to be aggressive competitors were non-native. Thus Canadian Waterweed and Nuttall's Waterweed, both of North American origin, were one or the other dominant or abundant in some lengths of the Cromford, Leeds & Liverpool and Pocklington canals. New Zealand Pigmyweed has the potential to become a nuisance in the Cromford Canal, while in the Leven Canal a bed of White Water-lily with distinctly pinkish flowers, observed in August 2016, was clearly a cultivar and might tend to out-compete the native plants.

3. Terrestrialization. When canals are neither navigated nor dredged, silt accumulates and emergent marginal vegetation tends to spread to occupy the whole width of the channel. Plant diversity decreases and the process can eventually lead to the development of fen and willow scrub. Amongst the SSSIs surveyed this process was apparent in parts of the Cromford Canal and Grantham Canal (Goulder, 2017a), to an extent at the western end of the Leven Canal, and notably in the Pocklington Canal (Goulder, 2017b). In 2013 much of the Pocklington Canal SSSI that was surveyed had come to be occupied by extensive Reed Sweet-grass or Common Reed that often took up all or most of the channel. Comparison of the 2013 records with records from a decade earlier, made by the same recorder at the same locations and using identical methods (Goulder, 2003), suggested that terrestrialization is underway and that there had been losses of aquatic plants since 2002. Plants recorded in 2002 but not in 2013 (Goulder, 2014a) nor in 2015 (Goulder, 2017b) included Small Pondweed, water-starworts, Greater Water-moss, Soft-rush, Water Forget-me-not and Water Mint.

4. Dredging and weed cutting. Obvious approaches for countering terrestrialization are dredging and weed cutting. Thus dredging and weed clearance of the Pocklington Canal in February 2015 (CRT, 2015) had led to the establishment in Lengths 6 & 7 of a 3-5m-wide open channel; in the following summer, although much of the canal bed remained as bare silt, there had been rapid colonization by Flowering-rush which was dominant/abundant in both lengths and by Shining Pondweed, Broad-leaved Pondweed and Lesser Water-parsnip which were frequent in Length 7 (Goulder, 2017b). The continued success of this clearance will, however, be dependent on the maintenance of a higher water level than was observed in June 2015. Dredging of the Grantham Canal east of Jericho Bridge during October-December 2014 (Anon., 2015a) resulted in a wider open-water central channel between emergent marginal vegetation than was generally observed further west. This, however, by summer 2015 had become extensively colonized by Water-soldier and, in Length 12, Rigid Hornwort (Goulder, 2017a); competition from these plants is likely to hinder the development of a species-rich community of submerged plants and is likely to hamper any re-introduction of Grass-wrack Pondweed. It was also noted that there were beneficial effects from the clearance of emergent vegetation from short lengths (30-50m) of the Grantham Canal west of Jericho Bridge, for example in Length 4 where a more-diverse community, colonizing a clearing in a Common Reed stand, included Flowering-rush, Canadian Waterweed, Arrowhead and Branched Bur-reed. In the Cromford Canal the suction dredging at the northern end (Lengths 11 & 12) in 2013 had not, however, promoted any great diversity of aquatic plants (Goulder. 2017a). This was perhaps because much of the 1.3km of Length 11 was heavily tree-shaded, being largely devoid of aquatic plants in summer 2015; dominant/abundant or frequent plants were confined to the more open extremities of this length, Spiked Water-milfoil and Fan-leaved Water-crowfoot at its south

end and Reed Sweet-grass at its north end. Length 12, although mostly unshaded, had no vascular submerged or floating-leaved plants in summer 2015, there being an un-colonized navigable channel, kept open by the operation of a trip boat, between encroaching largely mono-specific marginal stands of Reed Sweet-grass. It is possible that colonization of this length by submerged plants was hindered by a lack of plant propagules; plant fragments from Length 10 and the south end of Length 11 would need to be transported for over 1km, against the flow of the canal, in order to colonize the most northerly Length 12. The extensive cutting and removal of weed on the Leven Canal appeared to support the maintenance of a diverse community of submerged, floating-leaved and emergent plants (Goulder, 2017b). Much Rigid Hornwort had been dragged from the canal and was piled on the bankside along Length 1 while along Length 2 there was heaped Yellow Water-lily and the weed-cutting boat contained recently-cut Mare's-tail and Common Club-rush along with much Yellow Water-lily. This control programme may have favoured the scarce plants that were recorded in these lengths, notably Water-violet, Whorled Water-milfoil, Greater Bladderwort and Greater Water-parsnip. It is worth noting that main drains in East Yorkshire, that often roughly resemble canals in width and depth but are subject to annual weed cutting and regular removal of sludge, support great abundance and diversity of freshwater plants (Goulder, 2010). Indeed there is much overlap of plant species found in canals and main drains; 42 out of 66 taxa were recorded in both canals and drains in East Yorkshire (Goulder, 2008).

5. Eutrophication. In lowland England there has since at least the mid 20th century been widespread increase in concentrations of plant nutrients in rivers and streams, especially inorganic nitrogen, largely from fertilization of arable land, and phosphate, often from sewage-works outfalls (e.g. Mason, 2002). Canals with feeders from rivers and streams are liable to suffer increase in plant nutrients and eutrophication. For example, a feeder to the Pocklington Canal at Melbourne brings in water from Pocklington Beck downstream of a sewage-treatment works and brings about increased phosphate concentration in the canal; Mahami & Goulder (2011) showed increased extension growth by Canadian Waterweed and also used algal bioassay to show increase in algal-growth potential. Additionally, canals that receive run off from arable land or from pasture are liable to enrichment; this is possible in, for example, the Chesterfield Canal and Grantham Canal SSSIs. It may be that at enriched sites a limited range of more vigorous species, associated with richer conditions, have out-competed a more diverse flora of plants that are associated with more nutrient-poor habitats. In the Grantham Canal, for example, the dominant/abundant submerged/floating-leaved plants were Water-soldier, Rigid Hornwort, Common Duckweed and Ivy-leaved Duckweed (Goulder, 2017a). These have Ellenberg's N indicator values (E_N) of 6, 7, 6 & 5+ (Hill *et al*., 1999) whereas the apparently lost pondweeds, Flat-stalked Pondweed, Broad-leaved Pondweed, Blunt-leaved Pondweed, Lesser Pondweed and probably Grass-wrack Pondweed, tend to have lower E_N values of 5, 4, 5+, 6 & 4+ respectively. E_N values are broadly indicative of the nutrient richness of the habitat in which plants tend to grow; higher values indicate plants of richer habitats. Rigid Hornwort, which formed dense beds in some lengths of the Grantham Canal and Cromford Canal, favours a high-nitrogen regime (Goulder & Boatman, 1971) and is a particularly aggressive colonizer of eutrophic waters. Also in some nutrient-rich canals there can be dense growth of filamentous algae, especially *Cladophora*; this can smother submerged vascular plants and may have contributed to substantial losses of them, for example from the Chesterfield Canal (Goulder, 2017a).

6. Navigation. The passage of boats appears to have mixed impact on aquatic plants. The classic study by Murphy & Eaton (1983) suggested that aquatic plants continue to thrive up to a traffic density of around 2000 boat movements per year (normalized to a canal cross-section of 10m^2) while beyond that increased turbidity and mechanical damage inhibit plants. Eaton *et al.* (1989) showed that the greatest number of species of both open-water and emergent plants tended to be found between 200 and 600 movements per year; Willby, Pygott & Eaton (2001) found that light boat traffic led to maximum species richness, intermediate biomass and a greater likelihood that rare plants would be found. The traffic levels on the navigable SSSI canals visited in the present study were relatively light; 488 lock usages in 2015 on the Chesterfield Canal, 430 on the Huddersfield Narrow Canal and 996 on the Leeds & Liverpool Canal, which may be compared with annual usages of >8000 per year for some locks on the Llangollen, Oxford and Trent & Mersey canals (CRT, 2016). Thus, boats were perhaps not a critical problem; their passage caused temporary turbidity that for a while may have inhibited photosynthesis and also subsequent silt deposition that may have settled on and masked the leaves of submerged plants, but the channel was kept open, over-encroachment of marginal emergent vegetation was prevented and a diversity of habitats was maintained. Traffic on the Leeds & Liverpool Canal might, however, have reached a point where any increase would become a problem.

7. Canal restoration. The Huddersfield Narrow Canal and the Cromford Canal SSSIs have seen projects to restore them to navigation (Gibson, 2002; Stoker, 2008); the non-SSSI part of Pocklington Canal, between Melbourne and the River Derwent, has also been restored (Anon., 2008). The restoration of the whole length of the Huddersfield Narrow Canal was largely funded by public money and has many positive features from the perspectives of the local economy, urban regeneration, leisure provision and conservation of the historic built environment. It has not, however, been kind to the flora of the SSSI. Many aquatic plants have been lost (Table 4) and the current flora is impoverished. This impoverishment, especially the dearth of submerged/floating-leaved plants (Table 1), is a feature of the canal east as well as west of Standedge Tunnel (Goulder & Morphy, 2013) and is in marked contrast to the Huddersfield Broad Canal. The Broad Canal, which makes an end-on junction with the Narrow Canal in Huddersfield, has been continually navigable, supports a diverse and abundant flora that includes rare/scarce plants (e.g. Floating Water-plantain, Hairlike Pondweed, Blunt-leaved Pondweed) and is a good example of co-existence of boats and aquatic plants (Goulder & Morphy, 2013). The project to restore the Narrow Canal extended over about 20 years but much of the work appears to have been done relatively quickly and/or towards the end of the project. Locks 9W to 11W (Length 4 in Goulder, 2016) were restored 1987-1988, Locks 13W to 15W (Lengths 1 & 2) 1988-1990 and 1990-1991, while much of the canal further west and through Stalybridge was restored or rebuilt 1999-2001 (Gibson, 2002); the restoration between locks appears to have required the de-watering of pounds, rebuilding of wash walls and removal of silt. The process was perhaps too severe to allow survival and speedy recolonization by aquatic plants. It remains to be seen whether the re-introduction of Floating Water-plantain in 2015 (Anon., 2015b) will be a success. It may be that today's dearth of plants resembles the situation 200 years ago when the canal was new; if so time and patience may be the remedy. In contrast to the Huddersfield Narrow Canal experience, there is evidence that if only short sections of canals are rebuilt there can be rapid recolonization by aquatic plants, through spread of plant propagules from adjacent lengths of canal and/or from

introductions of plants. For example, a 2.5km length of the Grand Canal in Ireland required complete reconstruction following a major breach in 1989. The new channel was lined with impermeable membrane overlain by puddle clay and, following re-watering, Reed Sweet-grass, Common Reed and Common Club-rush were transplanted from neighbouring sites to control erosion of puddle clay along the channel margin. Within 30 months aquatic vegetation was abundant and 28 species were recorded (Caffrey & Beglin, 1996; Caffrey & Monahan, 1997). The restoration to navigation of about 3.5km of the northern end of the Cromford Canal (Lengths 9-12 in Goulder, 2017a) over much of the 1970s and 1980s was a much slower process (Stoker, 2008) and the post-restoration history is complex given the canal's fall back into dereliction and recent (2013) dredging and re-opening to navigation between Cromford Wharf and Wigwell Aqueduct (Lengths 10-12). Nevertheless, parts of the sometime restored canal retained a rich and diverse flora in 2015, especially Length 10 which had Canadian Waterweed, Nuttall's Waterweed, Spiked Water-milfoil, Broad-leaved Pondweed and Fan-leaved Water-crowfoot as dominant/abundant plants (Goulder, 2017a). In the Pocklington Canal the c. 8.2km between Melbourne and the River Derwent, that was restored to navigation through the 1970s and 1980s, makes an interesting comparison with the 6.8km of derelict SSSI canal between Pocklington and Melbourne. There was dredging and reconstruction of locks along the restored section and there is currently some weed cutting undertaken by the Pocklington Canal Amenity Society; boat usage is low with Gardham Lock being operated 195 times during 2015 (CRT, 2016) although, in addition, a trip boat is operated from Melbourne which does not routinely pass through this lock. In 2013 the restored canal had a central channel with abundant and diverse submerged and floating-leaved plants and there were wide margins of emergent plants (Goulder, 2014a); it is encouraging that Flat-stalked Pondweed, which was not found in the SSSI in 2013, persisted in the restored canal. It is also encouraging that a number of plants that were not found in the restored canal by this author in 2002 (Goulder, 2003) had appeared there by 2013; these included Broad-leaved Pondweed, Fan-leaved Water-crowfoot, Unbranched Bur-reed, Flowering-rush, Lesser Pond-sedge, Lesser Water-parsnip, Pink Water-speedwell *Veronica catenata*, Soft-rush, Tufted Forget-me-not *Myosotis laxa* and Water Mint (Goulder, 2014a). It would appear that the restoration has favoured aquatic plants by stopping and reversing the terrestrialization process that has led to deterioration of the flora in the SSSI.

The emphasis of this work has been on the plant conservation value of lengths of canal that are SSSIs. However, only a small proportion of the national canal system has been notified as SSSI; Briggs (2012) suggested around 9%. This raises the question of whether the notified canals are or were extra-special sites from a plant-conservation viewpoint or whether much of the canal network has significant conservation value with SSSIs representing sites that are simply good examples of a much wider range of conservation-worthy sites. The reality probably lies between these extremes. Some of the SSSIs are undoubtedly special. The Leven Canal, for example, is amongst these with its clear calcareous water, species-rich and abundant vegetation and scarce plants (Goulder, 2017b). Others, like perhaps the Chesterfield Canal, no longer present as outstanding (Goulder, 2017a) while the Huddersfield Narrow Canal (Goulder, 2016) is botanically much poorer than many non-SSSI canals. It is clear that many non-SSSI canals in Northern England have abundant aquatic plants and a botanical interest that at least equals that of some of the SSSIs that are dealt with in this work. For example:

- Canal sections of the Calder & Hebble Navigation, which in 2014 had 19 submerged and floating-leaved plants and 20 emergent plants. These included five pondweeds; amongst rare/scarce plants were Narrow-leaved Water-plantain, Floating Water-plantain, American Pondweed *Potamogeton epihydrus* and Hairlike Pondweed (Goulder, 2014b, 2015).
- Canal sections of the South Yorkshire Navigations, which in 2014 had 22 submerged/floating-leaved plants, including five pondweeds, and 26 emergent plants; amongst rare/scarce plants were Narrow-leaved Water-plantain, Frogbit and Greater Duckweed (Goulder, 2013, 2017c).
- The Selby Canal, which in 2012 had 16 submerged/floating-leaved plants and 22 emergent plants; rare/scarce plants included Narrow-leaved Water-plantain and Greater Duckweed (Goulder, 2014c).
- The Huddersfield Broad Canal, which in 2012 had 12 submerged/floating-leaved plants, including five pondweeds, and 16 emergent plants; rare/scarce plants included Narrow-leaved Water-plantain, Floating Water-plantain, Blunt-leaved Pondweed and Hairlike Pondweed (Goulder & Morphy, 2013).

It is evident that consideration of plant conservation in canals should not focus just on SSSIs; they might to a degree be special but nevertheless attention needs to be given to the canal system as a whole. A subjective assessment of the 2013/2015 records collected for this study suggests that very loosely the canal SSSIs may be ranked, in order of decreasing success in maintenance of their conservation value, as follows: Leven Canal; Leeds & Liverpool Canal; Cromford Canal≈Grantham Canal; Pocklington Canal; Chesterfield Canal; Huddersfield Narrow Canal. This is, however, very much a personal opinion. It is arguable that the notification of canals as SSSIs, largely in the 1980s, took place in a transient golden age after commercial navigation had ceased, while leisure navigation was absent or moderate in extent, and while terrestrialization of abandoned canals was not yet advanced. What is certain is that the SSSIs have all to a degree changed since notification; some rather more than others. This change is entirely to be expected; canals are artificial and, in the long term, biologically unstable habitats. Canal SSSIs cannot feasibly be frozen forever in the state they were at notification. Nevertheless, it is known that the composition of plant communities in canals can be relatively constant over long periods; for example, 60% of aquatic plants recorded in the Lancaster Canal before 1910 were still there in 1998 (Greenwood, 2005) while 48% of plants recorded in the 19th century in the Chesterfield Canal in Derbyshire and 57% in the Cromford Canal were still there in 2013 (Goulder, 2014d). Similarly, in Yorkshire canals the percentage of plants known to be present in the 19th century and still there in 2010-2011 was at least 56% in the Leeds & Liverpool Canal, 47% in the Barnsley canals (Barnsley Canal and Dearne & Dove Canal) and 46% in the Calderdale canals (canal sections of the Calder & Hebble Navigation and the Aire & Calder Navigation) (Goulder, 2012). It follows that conservation-worthy plant communities might be sustained by good luck and/or appropriate management for lengths of time that extend at least into decades. For this, however, both funds and political and societal support will be needed; these are perhaps most likely to be forthcoming in a climate in which canals are seen to have a mixed economy and where wildlife conservation exists alongside other compatible uses.

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Table 1. Submerged and floating-leaved aquatic plants (JNCC checklist species) recorded in canal SSSIs 2013/2015.

	Chesterfield Canal	**Cromford Canal**	**Grantham Canal**	**Huddersfield Narrow Canal**	**Leeds & Liverpool Canal**	**Leven Canal**	**Pocklington Canal**
Callitriche sp. water-starwort	0	+	0	+	+	0	0
Ceratophyllum demersum Rigid Hornwort	0	+	+	0	0	+	0
Chara/Nitella stonewort	+	0	+	+	0	+	+
Crassula helmsii New Zealand Pigmyweed	0	+	0	0	0	0	0
Elodea canadensis Canadian Waterweed	0	+	+	0	0	+	+
Elodea nuttallii Nuttall's Waterweed	0	+	+	0	+	0	+
Fontinalis antipyretica Greater Water-moss	+	+	0	0	+	0	0
Hippuris vulgaris Mare's-tail	0	0	0	0	0	+	0
Hottonia palustris Water-violet	0	0	0	0	0	+	0
Hydrocharis morsus-ranae Frogbit	0	0	+	0	0	0	0
Lemna minor Common Duckweed	+	+	+	+	+	+	+
Lemna trisulca Ivy-leaved Duckweed	+	+	+	0	+	+	+
Myriophyllum spictum Spiked Water-milfoil	0	+	0	0	0	0	0
Myriophyllum verticillatum Whorled Water-milfoil	0	0	0	0	0	+	0
Nuphar lutea Yellow Water-lily	+	0	0	0	0	+	+
Nymphaea alba White Water-lily	0	+	0	0	0	+	0
Potamogeton berchtoldii Small Pondweed	0	+	0	+	0	0	0
Potamogeton crispus Curled Pondweed	+	+	+	+	+	0	+
Potamogeton lucens Shining Pondweed	0	0	0	0	0	+	+
Potamogeton natans Broad-leaved Pondweed	0	+	0	0	+	0	+
Potamogeton pectinatus Fennel Pondweed	+	+	+	0	+	+	+
Potamogeton perfoliatus Perfoliate Pondweed	0	0	0	0	+	0	0
Potamogeton pusillus Lesser Pondweed	+	0	0	0	+	0	0
Potamogeton trichoides Hairlike Pondweed	0	0	0	0	+	0	0
Ranunculus circinatus Fan-leaved Water-crowfoot	0	+	0	0	0	+	+
Ranunculus penicillatus spp. *pseudofluitans* Stream Water-crowfoot	0	+	0	0	0	0	0
Riccia fluitans Floating Crystalwort	0	0	0	0	0	+	0
Sagittaria sagittifolia Arrowhead	+	0	+	0	+	+	0
Sparganium emersum Unbranched Bur-reed	+	+	0	0	+	+	+
Spirodela polyrhiza Greater Duckweed	0	0	0	0	+	0	0
Stratiotes aloides Water-soldier	0	0	+	0	0	0	0
Utricularia vulgaris Greater Bladderwort	0	0	0	0	0	+	0
Zannichellia palustris Horned Pondweed	+	0	+	0	+	0	0

+=present, 0=not recorded.

Table 2. Emergent aquatic plants (JNCC checklist species) recorded in canal SSSIs 2013/2015

	Chesterfield Canal	Cromford Canal	Grantham Canal	Huddersfield Narrow Canal	Leeds & Liverpool Canal	Leven Canal	Pocklington Canal
Acorus calamus Sweet-flag	0	+	0	+	+	0	0
Agrostis stolonifera Creeping Bent	+	+	+	+	+	+	+
Alisma plantago-aquatica Water-plantain	0	+	+	0	+	0	+
Apium nodiflorum Fool's-water-cress	+	+	+	0	0	0	+
Berula erecta Lesser Water-parsnip	+	+	+	0	+	+	+
Butomus umbellatus Flowering-rush	0	0	+	+	+	+	+
Caltha palustris Marsh-marigold	0	+	0	+	0	0	0
Carex acutiformis Lesser Pond-sedge	+	+	0	0	0	0	+
Carex elata Tufted-sedge	0	0	0	0	0	+	0
Carex pseudocyperus Cyperus Sedge	0	0	+	0	0	0	0
Carex riparia Greater Pond-sedge	+	0	0	0	0	+	+
Carex rostrata Bottle Sedge	0	0	0	0	0	+	0
Equisetum fluviatile Water Horsetail	0	+	+	+	0	+	0
Equisetum palustre Marsh Horsetail	0	+	+	0	0	0	+
Glyceria fluitans agg. Floating Sweet-grass	0	0	0	0	+	0	0
Glyceria maxima Reed Sweet-grass	+	+	+	+	+	+	+
Iris pseudacorus Yellow Iris	+	+	+	+	+	+	+
Juncus effusus Soft-rush	0	+	+	+	+	+	0
Mentha aquatica Water Mint	+	+	+	+	+	+	0
Myosotis scorpioides Water Forget-me-not	0	+	+	+	+	0	0
Nasturtium officinale agg. Water-cress	+	+	+	0	+	0	+
Oenanthe crocata Hemlock Water-dropwort	0	0	0	0	+	0	0
Oenanthe fistulosa Tubular Water-dropwort	0	0	0	0	0	+	0
Persicaria amphibia Amphibious Bistort	+	0	+	+	+	+	+
Phalaris arundinacea Reed Canary-grass	+	+	+	+	+	+	+
Phragmites australis Common Reed	+	0	+	0	0	+	+
Ranunculus flammula Lesser Spearwort	0	+	0	+	0	0	0
Ranunculus lingua Greater Spearwort	0	0	+	0	0	0	0
Ranunculus sceleratus Celery-leaved Buttercup	+	0	0	0	+	0	+
Rorippa amphibia Great Yellow-cress	0	+	0	0	0	0	0
Rumex hydrolapathum Water Dock	+	0	0	+	0	+	0
Schoenoplectus lacustris Common Club-rush	0	0	0	0	0	+	0
Sium latifolium Greater Water-parsnip	0	0	0	0	0	+	0
Solanum dulcamara Bittersweet	+	+	+	0	+	+	+
Sparganium erectum Branched Bur-reed	+	+	+	+	+	+	+
Typha angustifolia Lesser Bulrush	0	0	+	+	0	0	0
Typha latifolia Bulrush	+	+	+	+	+	+	+
Veronica beccabunga Brooklime	0	+	0	+	+	0	+

+=present, 0=not recorded.

Table 3. Number of species and sum of abundance scores for aquatic plants in canal SSSIs 2013/2015.

	Canal SSSIs						
	Chesterfield Canal	**Cromford Canal**	**Grantham Canal**	**Huddersfield Narrow Canal**	**Leeds & Liverpool Canal**	**Leven Canal**	**Pocklington Canal**
Submerged and floating-leaved plants							
Total *n* of species	11	17	12	5	15	17	12
Mean *n* (and range) per canal length	4.3 (3-9)	3.8 (1-8)	5.4 (3-8)	0.6 (0-2)	9.5 (7-13)	8.6 (5-14)	5.8 (4-8)* 4.8 (4-6)¶
Mean ∑*AS* (and range) per canal length	6.7 (4-12)	8.1 (3-18)	11.7 (9-14)	0.6 (0-2)	15.6 (11-21)	15.8 (13-21)	11.3 (8-15)* 9.5 (7-13)¶
Emergent plants							
Total *n* of species	17	22	22	18	20	21	19
Mean *n* (and range) per canal length	10.9 (9-14)	8.3 (4-14)	12.0 (6-15)	6.1 (1-13)	9.8 (5-16)	12.8 (9-15)	7.7 (3-12)* 7.8 (4-11)¶
Mean ∑*AS*(and range) per canal length	17.1 (13-24)	12.1 (4-22)	21.0 (9-26)	8.1 (1-18)	12.9 (5-22)	22.8 (19-26)	13.2 (5-19)* 13.3 (7-21)¶

The sum of abundance scores (∑*AS*) for each canal length was derived from assessment of the abundance of each species using the DAFOR scale: the DAFOR estimates were assigned a numerical score (i.e. dominant or abundant=3, frequent=2, occasional or rare=1) and ∑*AS* equalled the sum of these scores.

Recording was in summer 2015 except that some records for the Pocklington Canal, Leeds & Liverpool Canal and Cromford Canal are for summer 2013. Lengths of canal recorded were 0.5km along the Chesterfield (9 lengths), Grantham (12 lengths) and Pocklington (*6 lengths in 2013, ¶4 lengths in 2015) canals. For other canals: Cromford Canal (12 lengths) of mean length 0.7km (range 0.2-1.3km); Huddersfield Narrow Canal (9 lengths) mean 1.0km (0.8-1.4); Leeds & Liverpool Canal (10 lengths including one recorded in 2013) mean 0.9km (0.3-1.2); Leven Canal (5 lengths) mean 1.0km (0.4-1.4).

Table 4. The number of aquatic plants seemingly lost from canal SSSIs.

	Submerged and floating-leaved plants	**Emergent plants**
Chesterfield Canal	10	11
Cromford Canal	6	8
Grantham Canal	8	7
Huddersfield Narrow Canal	20	10
Leeds & Liverpool Canal	8	6
Leven Canal	8	11
Pocklington Canal	17	11

Values represent the number of species not recorded in 2013/2015 that were recorded earlier: i.e. Chesterfield Canal 1986-1993; Cromford Canal 1975-2000; Grantham Canal 1975-2006; Huddersfield Narrow Canal 1984-1998; Leeds & Liverpool Canal 1981-2001; Leven Canal 1950-2005; Pocklington Canal 1986-2007 (for more details see Goulder 2016a, 2017a, 2017b). Note that some species may have been missed in 2013/2015.

An ichthyosaur vertebra from the Cave Rock Member of the Kellaways Formation at South Cave Station Quarry, Yorkshire

Kenneth J. Phipps School of Environmental Sciences, Cohen Building, University of Hull
Email: melesmeles@melesmeles.karoo.co.uk

An isolated ichthyosaur centrum was collected during the 1990s from a spoil heap consisting of weathered fragments of the Cave Rock Member of the Kellaways Formation (Calloviense Zone, Enodatum Subzone) at South Cave Station Quarry, Yorkshire (SE920329). The quarry is a Site of Special Scientific Interest, famous for its exquisitely preserved invertebrate fauna but, to the author's knowledge, ichthyosaur remains have not been recorded. Although Stainforth and Sheppard (1931) discovered plesiosaur bones from the 'Kellaways Rock' at this location, ichthyosaur remains from the Cave Rock Member appear to be rare. It seems especially appropriate that this discovery should be recorded in the very journal for which Sheppard was both editor and regular contributor.

This specimen, shown in Figure 1, was collected by Mr A.J. Phipps and the author during one of several visits to the site during the 1980s and 1990s. The spoil heap of Cave Rock fragments from which the centrum came was created as a result of the extraction of the underlying Kellaways Sand Member for use in the iron-casting industry. Regrettably, the exact date on which the specimen was collected was not recorded at the time. The site has been described by several authors: Phipps (2007) provides further details of the site and a list of the earlier works.

The Cave Rock Member at South Cave Station Quarry is highly ferruginous in parts and iron mineralization has taken place on and within the specimen. Since the centrum is rather fragile and prone to cracking, patches of the matrix adhering to its surface have not been removed. Its

dimensions are: height: 117mm (excluding matrix), width: 112mm, length (at dorsal margin): 37mm, length (at ventral margin): 40mm. The method of preservation is remarkably similar to that mentioned in Sheppard's account (1900, p.536) of marine reptile remains from the 'Kellaways Rock' of East Yorkshire. Bones found at Elloughton, approximately 5¼km from the site at South Cave, were described as "...very ferruginous (some being almost like cast iron)...".

Although a specific name for the ichthyosaur from which this centrum originated cannot be established, it seems probable that it was an individual belonging to the genus *Opthalmosaurus* and that the vertebra came from its caudal region (Taylor, pers. comm., 2005; Noé, pers. comm., 2005; Martill, pers. comm., 2017). The specimen will be deposited with Oxford University Museum of Natural History (specimen number: OUMNH J.95400).

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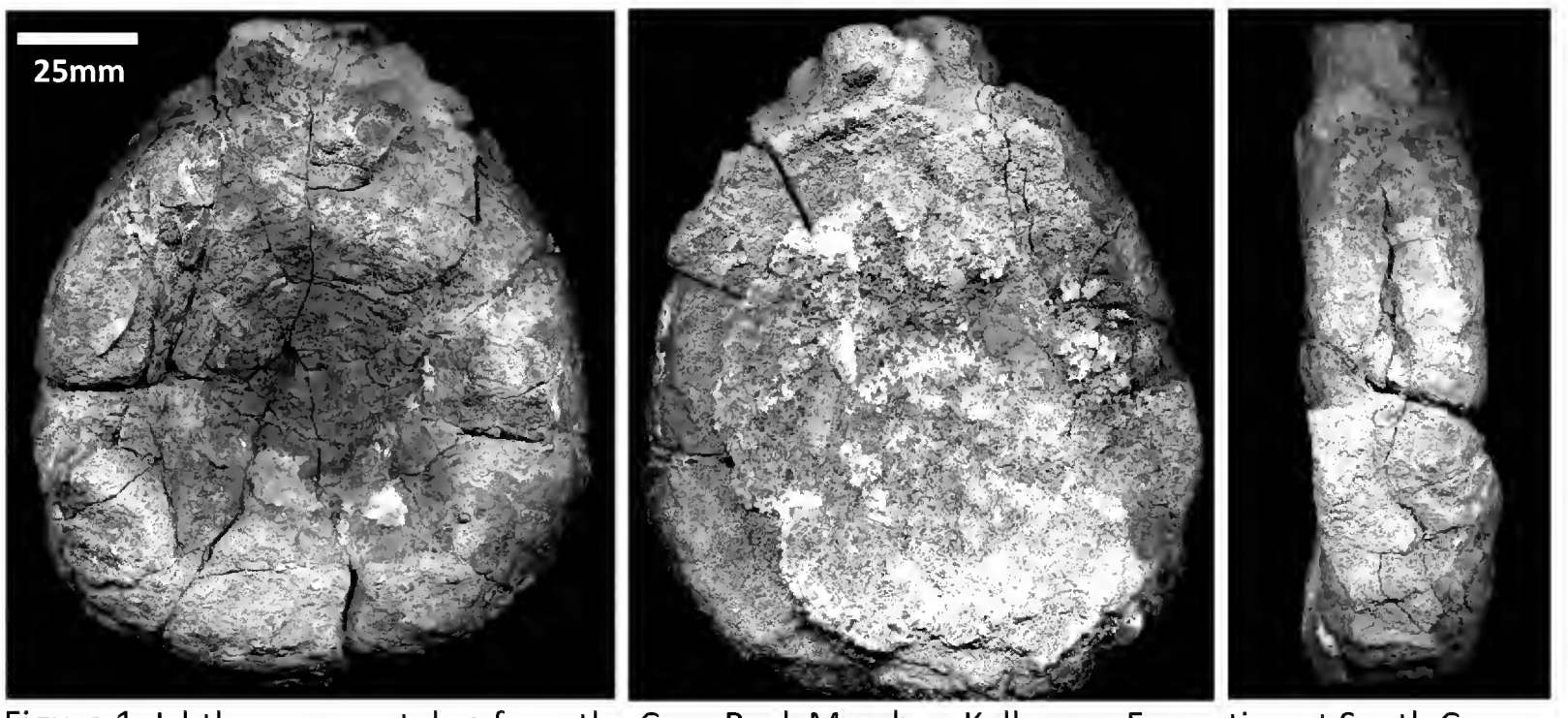

Figure 1. Ichthyosaur vertebra from the Cave Rock Member, Kellaways Formation at South Cave Station Quarry, Yorkshire. *Left*: Anterior view, *Centre*: Posterior view, *Right*: Right lateral view.

Mass mortality of adult Common Toads at two breeding sites in Yorkshire

Richard Shillaker and Martin Roberts
email: dick@islay.karoo.co.uk

Introduction

Common Toads *Bufo bufo* characteristically assemble in large numbers at traditional breeding pools in early spring. This may make them susceptible to predation but noxious chemicals secreted by the skin, especially by large parotid glands behind the head, coupled with the habit of individuals to inflate the body and stretch out the legs when threatened, may give a measure of protection (Bedford, 1974; Ewert & Traud, 1979). However, field observations indicate that some predators may not be deterred, leading to instances of mass mortality of adult Common Toads. This amphibian is known to be declining in Britain and is listed in section 41 of the Natural Environment and Rural Communities Act 2006 as a "species of principal importance for the purpose of conserving biodiversity". Therefore, investigation of sources of adult mortality is relevant to the conservation of this species. This article describes incidents of large-scale predation of Common Toads at two breeding sites in Yorkshire and compares them with similar incidents in the UK and elsewhere.

Observations at Askham Bog in 2016

On 6 April 2016 when visiting Askham Bog, a Yorkshire Wildlife Trust reserve near York, we noticed a large number of dead adult anurans along the edge of two adjacent flooded areas (in the water and on the surrounding mud). One flooded area had an extensive reed bed and the other was wooded.

We judged, without doing an accurate count, that there were at least 30 dead anurans scattered (i.e. not in clumps) along about 30m of shoreline. Most were lying on their backs with internal organs protruding from broken skin on the ventral surface of the body (Plate 2a, centre pages). A couple of carcasses were examined more closely and found to be Common Toad. Hence it was surmised that all the observed dead anurans were probably Common Toads; this is supported by finding a large number of predated Common Toads at the same location in the following year (reported below).

Subsequently, we sought advice and undertook an internet search to determine a possible cause for the observed mortality. One possibility was that the toads, when gathering in the shallow water to breed, had been attacked by Carrion Crows[1]. A large number of dead toads (species not stated), with internal organs apparently forced outside the body, have been reported from Germany and Denmark (NBC News, 2005). One theory proposed as to the cause of the German finding was that the toads had been attacked in this way by crows in order to avoid the irritating skin secretions and consume the nutritious liver. Noting this information, we decided to revisit Askham Bog. The objective of this second visit in 2016 was to examine the dead toads more closely, and especially to determine whether their livers had been removed.

On our return visit (14 April 2016), it is relevant to report that we saw two Carrion Crows and

1 Scientific names of animals mentioned in the article can be found in Table 2 pp185-6

two Buzzards. The water level was lower (we estimated by c.15cm) than during our previous visit. Anuran carcasses were much less obvious than before and harder to find. Most were now out of the water and in an advanced state of decay; a few were little more than skin and bone. We conducted two searches for carcasses on this return visit.

During the first search, covering about 50m of water's edge, we found 31 anuran carcasses with body length (tip of snout to end of abdomen) of 44-70mm. Owing to the extent of decomposition no attempt was made to confirm whether they were Common Toads. All carcasses had the ventral surface 'opened' and in most cases intestines could be seen but there was no obvious structure resembling liver. All the better preserved specimens gave the impression of there being something missing from the abdominal cavity but we did not draw any firm conclusions.

On the second search, which extended further around the water's edge, an additional 30 carcasses were collected and cursorily examined; this yielded no significant additional information (they appeared to be of a similar size range as the animals found on the first search). A further 25-30 very badly decayed specimens were also noted but were not collected.

Hence, on our second visit in 2016 we found a total of about 100 anuran carcasses. Taking into account the extent of decay and limited length of water edge searched it is likely that several hundred anurans had died at this site during the breeding season.

We subsequently showed a photograph of one of the carcasses to Paul Duff who had previously examined Common Toads apparently killed by Otters in Scotland (Duff & Hewitt, 1999). He observed that the photograph (Plate 2a, centre pages) showed, in addition to the intestines being exposed, that both rear legs had also been attacked, leaving only loose floppy skin. The pale inner surface of the leg skin can be seen in the photograph.

It should be noted that on neither visit to Askham Bog did we see (nor did we search for) any live toads or frogs, toad or frog spawn, nor any evidence of faeces left by a predator.

Observations at Askham Bog in 2017

On 30 March 2017 we revisited the flooded area with extensive reed cover and found a large number of anuran carcasses (no toads were found around this flooded area by MR on 15 March). Every carcass we examined closely was a Common Toad. However, there were notable differences in their distribution and appearance compared to the previous year.

We counted c.100 carcasses along some 80m of accessible water's edge. Unlike the previous year, the majority of carcasses were not scattered along the pond edge but were in small clumps of 5-20 carcasses (Plate 2b, centre pages). We counted about 15 clumps which were always out of the water, sometimes on flattened reeds. The clumps were associated with some degree of vegetation cover (reeds or bankside bushes); they were absent from a stretch of bare bank. In many cases there were signs of a clear path (c.20-25cm wide) of flattened reeds which led towards a clump of dead toads; the paths had most likely been created by a mammal.

Carcasses showed varying degrees of predation and decay. A few were very fresh kills (blood was evident) and a few just seemed to consist of skin. Many showed severe damage to the legs (front and back legs) and an opened ventral abdomen (the extent of the opening varied

greatly) with abdominal organs protruding; close inspection of the abdominal contents was not attempted. Many carcasses had one or more degloved limbs (leg skin rolled back over the lower limb and upper limb bone and muscle removed) and/or protruding limb bones stripped of flesh. Detached limb bones were also often seen lying near the carcasses; a pelvic girdle with two femurs attached was found. One toad was lying on its belly with a swollen body, several bloody wounds on its back (suggestive of bite marks) and what appeared to be torn skin on a front limb.

We found one dead female toad with the ventral abdomen opened and a black egg mass protruding. As we had the impression that carcasses appeared to be nearly all male we carefully examined 20 carcasses (mostly from one clump) with intact forelimb digits; all were males based on the presence of black nuptial pads on the two inner toes. Only two living toads were noted; both showed no external damage. One was extremely weak and seemed to be dragging its back legs. The back legs, which were floppy, showed no resistance to being handled, and the body appeared to contain a lot of fluid. The other toad was found lying on its back and also was very sluggish when handled.

We found no obvious mammalian spraints. One large owl pellet was noted; there was one deposit of goose-like faeces and what could have been the faeces of a small rodent.

No strings of toad spawn were seen.

A number of toad carcasses were placed in a veterinary deep freeze within a few hours of collection. Subsequently, three of the best preserved specimens were sent to the Institute of Zoology (IOZ) in London to be examined for evidence of disease (a service provided by the Garden Wildlife Health Scheme). Post-mortem examination at the IOZ of two toads without external signs of damage revealed no clear evidence as to the cause of death, although one toad had a heavy parasite load in the small intestine and lungs. The third toad had damage to its forelimbs; post-mortem examination also revealed multiple fractures to the cranial two-thirds of the spine which suggested that this toad had probably been crushed by a mammalian predator. Tissue samples taken from each of these toads for routine molecular tests yielded negative results for the presence of ranavirus and chytrid fungi (*Batrachochytrium dendrobatidis*/*B. salamandrivorans*), which are important infectious diseases of amphibians.

Observations at a private pond near Ellerker

Four visits were made by RS to a large private pond near Ellerker, East Yorkshire (9–21 March 2017). The pond is located in farmland with adjacent woodland. A total of c.44 carcasses were counted, of which 26 were collected and examined closely. A number of living toads were noted on each visit but were not counted. A summary of the findings is presented in Table 1.

Most of the carcasses were present in shallow water and were fairly fresh (blood was sometimes evident); the few found completely out of the water were more decomposed. Most carcasses showed evidence of having been attacked. Typically, a hole was present in the ventral abdomen with a section of gastro-intestinal tract protruding and in some cases one or more limbs had been attacked. The head and dorsal surface were intact; the only exception being one apparent intact carcass which when examined more closely had a small bloody mark below one parotid gland which was possibly the result of a bite from a predator.

Differences were noted in the distribution of carcasses and type of predation damage sustained by toads found on the north side of the pond compared with those on the south-east side.

On the south-east side of the pond 14 carcasses were scattered in shallow water along a 50m stretch close to the pond edge. In contrast, on the north side 18 of the 30 carcasses found were grouped together in a small area (0.5 x 0.5m) next to the end of a reed bed close to the edge of the pond. Most of these carcasses were in water less than 15cm deep, with a few lying out of the water. Other carcasses were scattered in shallow water along the pond edge. Three narrow paths (c.20-25cm wide) of flattened reeds led down to the water's edge close to the accumulated toad carcasses. The paths must have been created by a mammal. The width of the paths and the presence of a few dried out anuran carcasses suggested that they had been created by an Otter.

Table 1. Summary of observations on Common Toad carcasses* at pond near Ellerker.

Carcass parameter	**South-east side of pond**	**North side of pond**
Carcasses found	14	30
Distribution	All scattered in shallow water along 50m at edge of pond	18 in small area (0.5 x 0.5m) of shallow water/shore line. 9 scattered in shallow water. 3 in a path in the reeds.
Carcasses examined	13	13
Body length	5.4-6.2cm	5.2-6.0cm
Carcasses intact	5	0 (a small spot of blood below one parotid gland of one carcass indicated a possible bite mark)
Carcasses with perforated ventral abdomen	5 with single hole Length 0.8-1.2cm Width 0.6-0.8cm	11 with single hole Length 0.6-2.5cm Width 0.6-1.2cm
	1 with two holes Length 0.8-1.2cm Width 0.3-0.6cm	1 with two holes Length 1.5-1.6cm Width 0.2-0.5cm
	1 with whole of ventral abdomen opened	
Carcasses with limbs attacked	5 (none degloved**)	12 (8 carcasses with at least one limb degloved**)
Carcasses with front limbs attacked		
One limb	3	1
Both limbs	0	2
Carcasses with hind limbs attacked		
One limb	1	1
Both limbs	3	11

* Nearly all carcasses closely examined with at least one front limb intact were recorded as male (based on the presence of nuptial pads).

** Degloved in these toads means that bone and muscle had been removed from a limb in a way that resulted in the surrounding skin being folded back over the lower limb

Five of the 13 dead toads examined from the south-east side of the pond appeared to have intact skin, although one felt extremely floppy as if the skeleton had been damaged and another seemed full of liquid. Another five carcasses had a small rectangular-shaped hole (with a length of intestine protruding) in the ventral abdomen located just behind the front limbs. On the north bank only one of the thirteen examined toads appeared to be intact, although there was possible evidence of a bite mark on this toad. Most of the other toads examined from the north bank had a single hole in the ventral abdomen which in many cases was longer and wider than that seen on toads from the other bank (the incidence of protruding intestine was not recorded for the north bank toads).

The most striking difference between carcasses from the two banks was the incidence and type of damage to the limbs. Twelve of the toads examined from the north bank showed damage to one or more limbs compared with five toads from the other bank. In addition, only carcasses from the north bank had degloved limbs. Plate 2c (centre pages) shows a toad with three degloved limbs (the pale inner surface of the skin is visible); the hind limbs lack the femur and associated muscle and the tibulo-fibular bone can be seen protruding from the degloved hind limbs. When one of the degloved hind limbs of this toad was extended by RS it revealed a large ventral tear in floppy thigh skin from where bone and muscle had been extracted by the predator. A few limbs with a similar appearance (floppy thigh skin due to absence of femur and associated muscle) were present in toads from the north bank suggesting that these limbs could also have been degloved although the thigh skin was no longer folded back over the lower limb. The other main finding in toads from the north bank was of a hind limb apparently intact apart from the femur having been stripped of muscle.

Carcasses from the south-east side of the pond, in addition to showing no clear evidence of degloving, also had no hind limbs with floppy thigh skin. Damage to their hind limbs typically consisted of the femur detached from the pelvis, stripped of muscle and sometimes protruding at an angle through torn skin from an otherwise apparently intact leg.

Discussion

Mass mortality of adult Common Toads has been observed at Askham Bog near York (April 2016 and March 2017) and at a pond near Ellerker in East Yorkshire (March 2017). Many of our findings are suggestive of predation, although scavengers and poor body condition (following the demands of early season breeding) could also have contributed to the observed mortality and/or the mutilated carcasses. There is no known previous occurrence at Askham Bog of mass mortality of adult Common Toads due to predation (Brian Lavelle pers. com.); this has also not been reported previously from the Ellerker pond.

The death of several hundred Common Toads in 2009 at Quarryhouse Moor ponds in Northumberland was attributed to a late frost (Durkin, undated). However, this is not a plausible explanation for our findings because Met Office official records (www.wow.metoffice.gov.uk) show that air temperature in March 2017 only fell below 0°C on two days at Linton-on-Ouse near York (lowest -2.5 °C) and on two days at Leconfield near Hull (lowest -1°C). Similarly, Met Office official records indicate that air temperature near York in 2016 only fell below 0°C (to -1°C) on one day from March 1 to April 14 (date of our second visit to Askham Bog in 2016), although Linton-on-Ouse temperature records are incomplete for this period.

When Common Toads gather together in large numbers in ponds and other freshwater areas for breeding they can attract the attention of predators. To deter predators, Common Toads secrete irritant and toxic chemicals from glands within the dermal warts on the dorsal parts of the body and especially from the large parotid gland located dorsally behind each eye (Bedford, 1974). A Common Toad can also swell its body with air and stand on stiff legs as antipredator behaviour (Ewert & Traud, 1979). It has been suggested that the finding of toads with protruding intestines ('exploded' toads) at the German incident noted above was possibly due to the antipredator swelling response forcing intestines and other organs out through the abdominal opening inflicted by the predator.

There are reports of adult toads being predated at breeding aggregations in North America (Kagarise Sherman & Morton, 1993). Notably, predation by Ravens *Corvus corax* on Western Toads *Bufo boreas* was observed at three of fifteen explosive breeding aggregations in Oregon (Olson, 1989). At one aggregation over 20% of the total annual breeding population was killed and found eviscerated near the communal breeding site. Predation was observed when toads were breeding in shallow water, 5-25cm deep, but not when toads remained in deeper water. Carcasses were primarily found on logs and stumps used as perches by the Ravens. The remaining body parts included portions of dorsal skin, head, some limbs and eggs from gravid females. It was also noted that the skin from many legs had been peeled off and the limbs removed.

We could only find a few published reports of predation on adult Common Toads at breeding aggregations in the UK or elsewhere. These reports are outlined below. Reasons for the limited reporting of predation at breeding aggregations could include:

- Rapid decomposition of lacerated carcasses as indicated by our findings at Askham Bog in 2016. Indeed, if we had not actively looked for carcasses on our second visit that year we could have easily overlooked them.
- Further attack/removal by scavengers. Slater (2002) reported that over 100 frog carcasses were removed by Carrion Crows within a 2-hour period.

Smith (1951) reported that Crows and Magpies are known to attack Common Toads when they gather for breeding, disembowelling their prey but leaving the rest of the carcass uneaten. However the majority of published reports of mass mortality of adult Common Toads refer to predation (proven or suspected) by Otters. A number of different feeding techniques appear to have been used by Otters to avoid the toads' noxious skin secretions.

Evidence of mass predation of adult Common Toads was noted in south-west Scotland in April 1998 (Duff & Hewitt, *loc. cit.*). Approximately 30 carcasses were found at a large garden pond, mainly submerged in shallow water, and 355 dead and dying toads were counted at the water's edge of a reservoir. On examination of carcasses from both sites it was noted that the ventral abdomen had been opened and the hind limbs apparently degloved, leaving the upper torso and head largely undamaged. Radiography revealed pelvic fractures or dislocations and the absence of limbs distal to these lesions. A small percentage of carcasses had puncture holes in the skin; it is noteworthy that the owners of the garden pond had watched herons (presumably Grey Heron) attacking toads. However, at the reservoir there was good evidence of predation by Otters. Otter spraints were found near the shoreline, most of which contained anural limb and pelvic bones. It is noteworthy that within 10km of these locations a large number of Common

Toad carcasses had been found the previous April, and degloving was reported (Cunningham *et al.*, 1998). Cunningham *et al.* were of the opinion that the toads had been killed by humans, a conclusion not shared by Duff and Hewitt.

Slater (2002) also published evidence of mass predation of adult Common Toads at breeding pools beside the River Wye in mid Wales. In 1997, 1999 and 2002 he found 10-58 skinned toads in any one year. In most cases the hind limbs of toads had been skinned and eaten and the front half of the body discarded. However, some toads were totally skinned and the whole body apparently eaten. Total skinning was reported to be almost always achieved by a vertical incision, with the skin removed in one piece. The percentage of totally skinned toads increased in later years, which suggested to Slater that the predator had learnt an improved feeding technique. He also reported the loss of hind limbs of frogs from other sites in mid Wales. Predation of these toads and frogs was attributed to Otters because anural limb bones (predominantly hind limb bones) were present in Otter spraints collected from a number of sites within the Wye catchment.

It should be noted that Slater (*loc. cit.*) uses the term 'progressive skinning' of toads in the title of his paper and although he does not clearly state what is meant by this term it would appear to refer to the progressive increase in totally skinned toads over time. In a subsequent study, Almeida *et al.* (2013) refer to 'progressive skinning' when Otters have skinned and eaten the hind legs of toads but discarded the front half of the toad, i.e. there appear to be differences in what is meant by 'progressive skinning'.

Mass predation of adult Common Toads was reported in north Norfolk (Almeida *et al., loc. cit.*). A total of 601 dead toads were found around the margins of 59 small ponds in February and May 2011. Most of the carcasses (80%) were nearly complete bodies with a characteristic slightly lateral incision along the back behind the parotid gland. In most cases, the internal organs (e.g. heart, lung, liver, guts and eggs of females) had been removed. The other carcasses had been 'progressively skinned' (8%) or were completely smashed (14%). Predation was attributed to Otters because of the large number of fresh carcasses which were mostly accumulated in piles, the sighting of solitary Otters and the presence of fresh Otter spraints next to the toad kills. In addition, the authors considered it significant that some of the carcasses had been 'progressively skinned' which had been attributed by Slater to Otter predation but which they claimed had not been reported for other potential predators (Grey Heron, American Mink, European Polecat, European Badger). Some spraints contained toad bones, which provided confirmation that Otters had eaten toads.

There is a report of large scale mortality of adult toads (presumably Common Toads) around a fishing pond at Dibbinsdale Local Nature Reserve on the Wirral (Friends of Dibbinsdale, 2015). About 250 dead toads were found during March 2014. Piles of dead toads were present on and near fishing pegs, with more dead toads being added to the piles on a daily basis. Cuts to the skin, rupture of body content and mutilation were noted. Closer examination revealed that many leg bones and rear torsos had been stripped of flesh but heads were often, but not always, intact. Predation by Otter or American Mink was suspected but no spraints or fish remains were found. No dead toads were found the following year.

In a recent book about Otters on the River Tweed in Scotland (Campbell & Levin, 2014) there is

a photograph of a Common Toad with both hind legs appearing to have been degloved and the flesh removed. The authors proposed that this is an example of Otter predation. There are also unpublished reports of large scale mortality of adult Common Toads in northern England. These reports, together with unpublished reports of predation and scavenging of adult Common Toads in Yorkshire, are summarised in Appendix 1. In a number of cases predation by Otters or American Mink was suspected.

Otter predation of Common Toads gathering for breeding has also been documented in continental Europe. Common Toads were reported to be the main food of Otters in an area of North-west Spain where pollution was considered to have reduced the fish population (Garcia-Diaz & Ayres, 2010). A comparable situation, associated with reduced availability of frogs and fish, has been reported in Poland (Sidorovich & Pikulik, 1997). Along one river where toads were concentrated for breeding in April 2015, there was evidence of significant predation by Otters, i.e. the finding of many skinned Common Toads and the presence of the bones of Common Toads in nearby Otter spraints. Studies that provide definitive evidence of predation on adult Common Toads by Otters and by other species are listed in Table 2 (references to suspected predators of Common Toads are not included in this Table).

Although we had initially thought that the toads found at Askham Bog in 2016 might have been attacked by Carrion Crows, there are a number of other animals which could have killed and/or scavenged the toads. These other potential candidates include Buzzard, Grey Heron, Magpie, Brown Rat, Otter and American Mink. Although one or more of these may have killed toads and/or scavenged from the carcasses, the most likely main predator at both our sites would seem to be the Otter. Otters have been reported from Askham Bog (Brian Lavelle, pers. comm.) and apparently in the Ellerker area.

Table 2. Some published evidence for known predators of the adult Common Toad*

Predator	**Location**	**Comments**	**Reference**
Otter *Lutra lutra*	Scotland	Toad bones in Otter spraints and one captive Otter cub partially consumed toads after skinning them (no details of skinning technique provided).	Weber (1990)
Otter	Yorkshire	Toad bones in Otter spraints	Alderton *et al.* (2015)
Otter	Norfolk	Toad bones in Otter spraints	Almeida *et al.* (2013)
Otter	North-west Spain	Toad bones in Otter spraints. Main food item when toads gathered for breeding; fish not abundant in the area (pollution).	Garcia-Diaz & Ayres (2010)
Otter	Central Spain	Toad skins (turned inside out) close to Otter spraints containing toad bones	Lizana & Mellado (1990)
Otter	Poland	Skinned toads and toad bones in Otter spraints in an area toads gathered for breeding. Frogs and fish not abundant.	Sidorovich & Pikulik (1997)
Otter	Belarus	Toads** minor prey item based on scat analysis	Sidorovich & Pikulik (1997)
Polecat *Mustela putorius*	Belarus	Toads** significant prey item based on scat analysis	Sidorovich & Pikulik (1997)
Badger *Meles meles*	Belarus	Toads **significant prey item based on scat analysis	Sidorovich & Pikulik (1997)

European Mink *Mustela lutreola*	Belarus	Toads** minor prey item based on scat analysis	Sidorovich & Pikulik (1997)
American Mink *Neovison vision*	Belarus	Toads** minor prey item based on scat analysis	Sidorovich & Pikulik (1997)
Brown Rat *Ratus norvegicus*	-	Rat skinned toad and then ate flesh	Loveridge (1913)
Hedgehog *Erinaceus europaeus*	-	Other reports are cited	Ewert & Traud (1979)
Carrion Crow *Corvus corone*	Derbyshire	Crow seen eviscerating a toad	Messenger (1998)
Hooded Crow *Corvus cornix*	Sweden	Crow seen eviscerating a toad	Vogrin & Vogrin (1998)
Magpie *Pica pica*	-	Reported to eviscerate toads gathered for breeding	Smith (1951)
Buzzard *Buteo buteo*	Croatia	Buzzards seen skinning toads injured by traffic on roads; evidence of a Buzzard skinning a toad at the breeding pond	Jovanovic *et al.* (2011)
Grey Heron *Ardea cinerea*	Scotland	Heron seen attacking toads	Duff & Hewitt (1999)
Great Grey Shrike *Lanius excubitor*	Poland	Shrikes seen skinning toads; consumption of part of body noted	Antizak *et al.* (2005)
Grass Snake *Natrix natrix*	Dorset	Toads major component of diet, presumably swallowed whole.	Reading & Davies (1996)

* This Table illustrates the range of known predators of adult Common Toads. The list of references is not intended to be comprehensive (although particular emphasis has been placed on finding evidence of predation by Otters). References to suspected predators of adult Common Toads are not included in this Table.

** In this example, Toads refer to *B. bufo* and/or *B. viridis*

The evidence in favour of Otter predation of Common Toads at Askham Bog and near Ellerker is as follows (although no Otter spraints were found):

1. Otters primarily feed on fish but they are known to eat Common Toads. Field studies have shown they will eat toads, especially when fish are not abundant (Garcia-Diaz & Ayres, 2010, Sidorovich & Pikulik, 1997). When hunting for fish in cold water an Otter cools down rapidly and this results in a huge energy drain (Kruuk, 2006); in contrast, the presence of large numbers of toads in shallow water probably represents a food source requiring much less energy expenditure.

2. Paths through the reeds leading down to the accumulated carcasses indicated predation by a mammal rather than a bird. The width of the main paths (c.20-25cm) was suggestive of the passage of an animal the size of an Otter rather than the much smaller American Mink. The size of the flattened areas of reeds where the accumulated carcasses were found at Askham Bog in 2017 was also suggestive of the presence of an animal the size of an Otter.

3. The carcass findings at both of our sites, i.e. ventral abdomen opened and hind limbs in particular stripped of muscle (often degloved), are similar to those of Duff and Hewitt (1999) who presented good but not conclusive evidence of Common Toad predation by Otters. The presence of Common Toad carcasses with skinned hind legs was also attributed to Otter predation by Slater (2002) and Almeida *et al*. (2013).

4. The finding of carcasses with an opened ventral abdomen and evidence for skinned hind limbs is also consistent with the technique perfected by Otters when predating Iberian Common Toads *Bufo spinosus* (Morales *et al.*, 2016). In this study the behaviour of two captive-born Otters, which had never seen a toad before, was recorded when they were presented with toads. Initially, the toads were rejected by the Otters, apparently due to the irritant effects after biting the head and back (Otters were seen to sneeze, salivate, rub their snouts and vomit). The Otters then perfected a technique which involved using their forepaws to turn the toad over and making incisions with their canine teeth in the toad's ventral surface (the head and back of the toad were avoided). They also continually washed their skinned prey before consumption, presumably to remove the irritant skin secretions. The Otters mainly ate the back legs and rejected the head, back and viscera (especially the ovaries in the case of pregnant toads). The investigators noted that the rejected parts resembled the skinned toads found in the wild. Interestingly, when these captive Otters were offered both Brown Trout *Salmo trutta* (their normal diet) and toad they neither attacked nor consumed the latter.

5. The presence of carcasses in groups out of the water at Askham Bog in 2017 is consistent with the findings in north Norfolk which were attributed to Otter predation by Alemeida *et al*. (2013), and with the findings at Dibbinsdale Local Nature Reserve. There was also one accumulation of carcasses in shallow water at the pond near Ellerker. Although in 2016 the carcasses at Askham Bog were not in groups it is possible that heavy rain and a rise in water level could have dispersed carcasses along the water's edge (the water level at Askham Bog was much higher when we first found the carcasses in 2016 than when we observed the clumps of carcasses in 2017). It is, however, noteworthy that groups of several carcasses were not reported at other sites where mass predation by Otters was suspected (Duff & Hewitt, 1999; Slater, 2002).

6. The large number of toads attacked, with an apparently limited amount of tissue taken from each toad, is consistent with the energy needs of a large predator such as an Otter.

Finally, the following points are worthy of noting:

At both breeding sites investigated in 2017, nearly all the carcasses closely examined were male (based on the presence of nuptial pads). Trevor Beebee (pers. comm.) has pointed out that the finding is not unexpected because male toads greatly outnumber females at breeding sites (commonly by 5 to 1, but sometimes more) and because the behaviour of males is much more conspicuous (swimming around, grabbing each other, etc.). Lizana & Mellado (1990), who provide evidence for Otter predation of Common Toads at breeding sites in Spain, also noted a preponderance of skinned males (12 males: 1 female); this was attributed to the much longer time male toads spend in the breeding pond compared to females.

We found two toads that appeared to have been bitten on their dorsal surface and then possibly rejected. Skin glands secreting noxious chemicals are reported to be limited to the back of the adult Common Toad (Bedford, 1974) but no detailed account of the distribution of these skin glands could be found, e.g. to confirm a total absence from the limbs. It is assumed that by attacking the ventral abdomen and removing skin from the limbs exposure of a predator to the noxious secretions would have been avoided or at least minimised.

The distribution of carcasses and type of predation damage sustained by toads showed notable differences on opposite sides of the pond near Ellerker. In particular, only on the north bank was there an accumulation of carcasses in a small area and evidence of degloving. Perhaps the reeds on the north bank provided the necessary protective cover for an Otter to feel sufficiently at ease to undertake the dexterous, and presumably time consuming, process of degloving one or more limbs. It is noteworthy that the clumps of carcasses found at Askham Bog in 2017 were associated with some degree of vegetation cover (reeds or bankside bushes) and degloved limbs were frequently observed. It is possible that an Otter responded to the more open aspect of the south-east side of the Ellerker pond by employing a slightly different feeding technique; it is also possible that the open aspect and shallow water favoured predation by a heron. The reason for the more frequent occurrence of dead toads with no external evidence of injury on the south-east of the pond is unclear.

As reported above, Almeida *et al.* (2013) state that 'progressive skinning' (hind legs skinned and eaten) of toads has not been reported for American Mink. This is another predator known to have frequented Askham Bog (Brian Lavelle, pers. comm.) and for which there is a claimed report near Ellerker in recent years. However, Ahola (pers.comm.), when working on a remote island in the outer Finnish South Western archipelago in late May 2001, found 3-4 skins of Common Toads on or near flattened paths (width less than 10cm) in the grass and moss around a pool. American Mink were the only mustelids known to have reached the outer archipelago at that time and had been seen on the island a few years previously. The toad skins, which were lying singly, had been turned inside out and seemed to lack body contents although Ahola cannot recall the appearance of the limbs, i.e. whether the limbs had been skinned and eaten. These observations are the basis of his published proposal that American Mink can eat Common Toads after skinning them but probably only in extreme circumstances, such as the lack of other food (Ahola *et al.*, 2006).

We have plans to further investigate the predation of Common Toads at their breeding sites and would welcome receiving reports of similar findings. The implications of such extensive mortality, which would appear to involve predominantly male toads, for local toad populations remain an intriguing question. Our findings are also of interest in the context of a nationally decreasing Common Toad population and a recovering Otter population.

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Appendix 1. Unpublished reports of large scale mortality, predation and scavenging of adult Common Toads in Northern England

Location	Details	Source
Incidents of mass mortality of adult Common Toads in Northern England*		
Cabin Hill National Nature Reserve, Merseyside	Two incidents of mass mortality were noted on the edge of a large pool. In March 2010, 75 Common Toad carcasses were found; back legs had been eaten. On 12 March 2016, 58 freshly dead adult Common Toads were found; some were disembowelled and most had the back legs partially eaten. The culprits were not identified but Otters were known to have been in the area. RS examined photographs of toads found in 2010 and noted floppy hind leg skin (consistent with 'degloving') and that sometimes only the head and front legs remained.	Philip Smith, pers. comm.
Former lead mining site in the Pennines	Thousands of disembowelled Common Toads were found some years ago piled up around a small reservoir. Gulls were considered to be the most likely culprits, although none were seen on the site.	Martin Hammond, pers. comm.
Kexby, near York	Mr R. Crossley recollects seeing many dead Common Toads scattered on the bank of old clay pits in March 1990. Nearly all had their bellies 'pecked' open. Some toads were alive. The owner of the site reported seeing a Grey Heron attacking the toads.	Roy Crossley, pers. comm.
Reports of predation and scavenging of adult Common Toads in Yorkshire		
Forge Valley, North Yorkshire	In 1937, an Otter had been feeding on Common Toads which had been carefully skinned; the heads and skin having been rejected.	YNU record: Colin Howes, pers. comm.
Near River Foss, North Yorkshire	An Otter was present at a large pond for three weeks in the spring of 1972. Spraint analysis showed its diet included Common Toads.	Colin Howes, pers comm. (original information from Colin Simms, Yorkshire Museum)
Bretton Park Nature Reserve, West Yorkshire	A small collection of disembowelled Common Toad skins was found in the base of a hollow tree on an island in March 1991. Owing to the cached/hidden nature of the find, it was considered likely that the toads had been preyed upon by an American Mink.	Colin Howes, pers. comm.
Givendale, East Yorkshire	A cache of Common Toads and Common Frogs with their legs nipped off was found on the bank of a pond some twenty years ago; predation by American Mink was suspected.	Alan Mullinger, pers. comm.
Near Sledmere, East Yorkshire	In the first few months of 2017, a Buzzard was reported feeding on an apparent cache of Common Toads; no other details are available.	Alan Mullinger, pers. comm.

* Any further reports of predation of Common Toads at their breeding sites would be gratefully received.

A survey of the flowering plants found on drystone walls in the Yorkshire Dales

Michael Pearson Austwick Hall, Austwick, Via Lancaster, LA2 8BS
email: michaelpearson@austwick.org

Introduction

For centuries botanists have known that some plants are associated with walls. For example, Ivy-leaved Toadflax *Cymbalaria muralis* and White Stonecrop *Sedum album* were described in early botanical volumes as growing on walls. From their very names Wall Lettuce *Mycelis muralis*, wall-rocket and Wallflower *Erysimum cheiri* make clear their favoured habitat. However, the first systematic account of the vegetation of walls was not published until 1888 when Richard (1888) studied the walls of churches in Poitiers, France. In the 20th century the walls of Cambridge (Rishbeth, 1948) and Durham (Woodsell & Rossiter, 1959) were also surveyed and all were found to possess high numbers of plant species, including a fair number of garden escapes. Though these studies provide fascinating insights, the walls investigated often consisted of brick with mortar and cement – quite different from the constituents of a traditional drystone wall in the Yorkshire Dales. It is only in the latter part of the 20th century that vegetation of drystone walls has received any attention and, as far as I am aware, no survey of the flora of walls in the Yorkshire Dales National Park (YDNP) has been undertaken. So the purpose of this study was to survey the flowering plants growing on drystone walls, consider some of the factors which may influence their distribution and explore how this contributes to our understanding of the ecology of walls.

Survey

In total 78 c.100m sections of walls were selected for the survey to provide a range of geology and altitude (between 150 and 660m) distributed throughout the un-extended YDNP. Each wall was surveyed thrice between April 2015 and September 2016 to ensure full seasonal coverage. All these walls, apart from one, were featured in earlier surveys of snails and ferns (Pearson 2016, 2017).

Results

There were, in total, 81 species of flowering plants identified during the survey, of which 26 were grasses, sedges or rushes (monocots). These are listed in Appendix 1 (p195). However, only nine were recorded on fifteen or more walls (i.e. 20% of walls). These were Stinging Nettle (60%), Wavy Hair-grass (53%), Herb Robert (38%), thistles (38%), Wall Speedwell (26%), Dog's Mercury (23%), Goosegrass (22%), Ivy (21%) and Wild Thyme (21%). The rarity of many of the plants puts the total in a somewhat different light: 23 of the 81 plants were recorded on only a single wall whilst 47 were found on less than six walls (5% of the sample).

Table 1 is a summary of the occurrence of the number of species on the total sample of walls. As many of the monocots were rarely recorded in the survey they have been treated separately. The majority of walls contained few grasses: 95% of walls had three or fewer and the maximum number was five. In the case of the other flowering plants (dicots) the number of species was more evenly distributed. Only 5% of walls had no wild flowers on them and 44% of walls had five or fewer dicots. A significant proportion of the sample provided a habitat to six or more and there were 13% with nine or more species. The richest wall had 21.

Table 1. The occurrence of flowering plants on drystone walls

Number of species	% of walls with monocots	% of walls with dicots
0	29	5
1	31	12
2	26	12
3	9	9
4	3	9
5	2	14
6	0	9
7	0	6
8	0	10
9	0	13

The relationship between the number of species and altitude was tested statistically. The Pearson correlation coefficients for the number of grasses (r=0.06), other flowering plants (r=-0.06) and the total vascular plant species (r=-0.07) were not statistically significant (p values ranged from 0.26 to 0.60).

The wall with the greatest number of species was one built from stone of mixed geology i.e. it contained both limestone and acidic rock. Conversely, the impoverished walls appeared to be those constructed from acidic stone. This was tested statistically and Table 2 is a summary of the mean number (with standard deviations) of the total number of plants for the three geological groups. Comparisons, using Student's t- test, showed that there were no statistically significant differences when considering the number of monocots, the other flowering plants and the total vascular plants (p values ranged from 0.50 to 0.06). Although geology may be a factor in determining the number of plants living on drystone walls it is not as important as initially suggested.

Table 2. Summary of the distribution of flowering plant species found relative to the geology of the wall's structural material.

Mean no. of species (standard deviation)	Limestone (n=29)	Non-limestone (n=20)	Mixed (n=29)
Monocots	1.3 (1.0)	0.5 (1.0)	1.6 (1.3)
Dicots	5.1 (2.9)	3.8 (3.7)	5.7 (3.6)

Another possible association considered was the aspect of the wall: in other words, comparing the number of plants with those walls facing north/south with those running east/west and also the diagonals between. As an indicator of exposure to sunlight and possible stress of water-loss this proved impossible to demonstrate statistically!

Discussion

The early studies of city walls generally show greater number of plants compared to drystone walls. For example, in the survey of Durham walls 161 flowering plants and grasses were identified compared to the 81 in the current study. This may be due in part to the differences in substrate (the Durham walls included those built of brick and mortar) as well as the greater number of garden plants. The 161 included 40 garden plants such as Michaelmas daisies, figs and lupins. This suggests that the number of plants found on walls is determined by the number

available to colonise the structures. The composition of the walls may be of importance but so too could be other factors such as the age of the walls.

In all there have been three surveys of the flowering plants of drystone walls and all of them have been in Somerset (Payne, 1989; Hill, 2008) and Wiltshire (Presland, 2008). Unfortunately, only the most common plants in the Chew Valley study were published, 18 of them occurring in over 30% of walls compared to just four in the Yorkshire Dales. There were eight found on 60% or more walls, ranging from Herb Robert (88%) to Ivy and Cocksfoot *Dactylis glomerata* (63%). Six of these eight plants were also recorded in the Dales but less frequently. In the Wiltshire survey only seven plants were recorded and only one, Biting Stonecrop, was in common with the Dales study. This was also the most commonly recorded plant, being found on 72% of walls. The low number of plants may be due to the fact that the survey focused on the top of walls rather than lower down.

The final survey was of 64 walls in the Mendips. Over 60 flowering plants were identified, half of which were in common with those found in the Dales. All were found in 1 to 20% of walls and only bramble was found in 21-40% of the sample.

In summary, plants were recorded with greater frequency on the Chew Valley walls compared with the other surveys and there was considerable variation in the content of the vegetation when considering different areas. There are methodological differences between the four surveys and this may explain the variations observed. If one accepts the limitations of the data then a more fruitful approach may be a consideration of the natural history of the plants found in the present study and then see whether any conclusions can be applied to the other areas.

When the walls were constructed the stone would have been gathered from the ground or else quarried nearby. Apart from algae, lichens and mosses already growing on the stone it is unlikely that any vascular plants would have been present when the structure was built. A new wall is not a promising environment; there is little soil and conditions are extreme. Though rainfall may be high it also drains away quickly and solar radiation may result in widely fluctuating temperatures with the high wind speeds associated with the uplands (Darlington, 1981). The colonisation of walls by plants will depend on a number of factors. There will be those which arrive by vegetative reproduction; some of the grasses, thistles, Stinging Nettle, Wild Strawberry and so on which are already established in the surrounding environment may be able to colonise the lower wall levels by runner, suckers etc. This is probably a substantial group for which walls provide a marginal habitat. Other plants will have their seed dispersed by birds, mammals and wind and will find new sites, such as walls, more or less suitable for their growth. Examples of this group could include the brambles and Cleavers as well as some of the grasses. The final group consists of those plants which show particular adaptations to life on walls such as Ivy-leaved Toadflax, some of the grasses and the stonecrops. Some may have originated from cliffs and rocky places and then successfully colonised walls as similar habitats. These groups are not exclusive in that the seeds of some plants may have been dispersed by birds and also spread by runners, for example the Wild Strawberry. Another example could be Sycamore seeds which have been dispersed by wind and mammals. Although seeds may reach a wall there will be those that do not germinate, and there will be those that germinate but do not survive to maturity. Again Sycamore provides an example from the present study, as it was found on nine of the walls but only once as a mature tree. The others were seedlings which did not survive their first season.

It is worth considering some of the plants that show particular adaptations to life on drystone walls. There are a number of xeromorphic features such as succulent leaves (stonecrops), thick and fleshy leaves (Navelwort *Umbilicus rupestris*) and hairyness (hawkweeds) which allow these plants to survive periods of water shortage. The Ivy-leaved Toadflax has an unusual feature of seed dispersal; once fertilised the seed head turns away from the sunlight so that the seeds are released into the crevices of the wall. Despite this, these plants were only rarely encountered in the survey. Another adaptation which may have proved more successful was suggested by a study of a community of annual plants found on limestone ledges and screes in Derbyshire (Ratcliffe, 1961). The group consisted of Rue-leaved Saxifrage *Saxifraga tridactylites*, Wall Speedwell, Thale Cress *Arabidopsis thaliana*, Thyme-leaved Sandwort *Arenaria serpyllifolia*, Hairy Bitter-cress, Wall Whitlowgrass *Draba muralis* and Common Whitlowgrass *Erophila verna*, Little Mouse-ear *Cerastium semidecandrum* and Early Forget-me-not *Myosotis ramosissima*. It was shown that all members of the group have similar life-cycles; they all flower and produce seed in the spring but these seeds do not germinate until the autumn. They may not flower simultaneously but germination is delayed until September. The seeds thus lie dormant over the summer when their habitat is likely to be too dry for them. Having germinated, the plants grow until December and, with the onset of more favourable conditions in the spring, they flower and set seed. The only two plants of this group found in the survey were Hairy Bitter-cress and Wall Speedwell but they occurred on nearly 8% and 25% of walls respectively. Similarly, these were the only plants recorded in the Mendip study but were not found in the Chew Valley or Wiltshire surveys. However, the Rue-leaved Saxifrage was identified in the latter two studies. Perhaps the other plants found on walls show a similar life-cycle.

Conclusions

In summary, 81 vascular plants, excluding ferns, were found growing on drystone walls in the Dales. However, there were wide variations with some walls being devoid of flowering plants whilst the richest wall had 21 species. Whilst a number of factors may influence the species richness on any wall, no statistically significant association was found in the present study. The colonisation of walls may be largely a matter of chance; in part dependent on the plants living in the immediate neighbourhood and their methods of dispersal. The majority of plants living on walls appear to be opportunistic or what gardeners would describe as weeds. They are able to take advantage of a challenging environment where there is little competition from other vascular plants. Another component of the flora appears to be more specialised, with adaptations to withstand drought conditions. These plants were only occasionally found in the survey. There is still much to be discovered about the flora of walls; such as the rate of colonisation and possible succession of the vegetation.

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Appendix 1. List of the plants found during the drystone wall survey

Monocots	
Agropyron repens Common Couch	*Helictotrichon pubescens* Downy Oat-grass
Agrostis canina Velvet Bent	*Helictotrichon pratense* Meadow Oat-grass
Agrostis gigantea Black Bent	*Holcus lanatus* Yorkshire-fog
Aira caryophyllea Silver Hair-grass	*Isolepsis setacea* Bristle Club-rush
Alopecurus pratensis Meadow Foxtail	*Juncus articulatus* Jointed Rush
Avena fatua Wild Oat	*Lolium perenne* Perennial Rye-grass
Avena sterilis Winter wild Oat	*Milium effusum* Wood Millet
Briza media Quaking-grass	*Phleum pratense* Timothy
Carex nigra Common Sedge	*Poa annua* Annual Meadow-grass
Catopodium rigidum Fern-grass	*Poa pratensis* Smooth Meadow-grass
Deschampsia flexuosa Wavy Hair-grass	*Poa nemoralis* Wood Meadow-grass
Festuca ovina Sheep's-fescue	*Poa trivialis* Rough Meadow-grass
Festuca filiformis Fine-leaved Sheep's fescue	*Trisetum flavescens* Yellow Oat-grass
Dicots	
Acer pseudoplatanus Sycamore	*Lonicera periclymenum* Honeysuckle
Achillea millefolium Yarrow	*Lotus corniculatus* Common Bird's-foot-trefoil
Aegopodium podagraria Ground-elder	*Mercurialis perennis* Dog's Mercury
Anemone nemorosa Wood Anemone	*Minuartia verna* Spring Sandwort
Anthriscus sylvestris Cow Parsley	*Oxalis acetosella* Wood-sorrel
Artemesia vulgaris Mugwort	*Pentaglottis sempervirens* Green Alkanet
Calluna vulgaris Heather	*Potentilla sterilis* Barren Strawberry
Cardamine hirsuta Hairy Bitter-cress	*Prunus spinosa* Blackthorn
Chamerion angustifolium Rosebay Willowherb	*Radiola linoides* Allseed
Cirsium arvense Creeping Thistle	*Ranunculus ficaria* Lesser Celandine
Cirsium heterophyllum Melancholy Thistle	*Ranunculus repens* Creeping Buttercup
Cirsium vulgare Spear Thistle	*Ribes uva-crispa* Gooseberry
Corylus avellana Hazel	*Rosa* sp. roses
Crataegus monogyna Hawthorn	*Rubus fruticosus* agg. brambles
Cruciata laevipes Crosswort	*Rubus idaeus* Raspberry
Cymbalaria muralis Ivy-leaved Toadflax	*Rumex* sp. docks
Digitalis purpurea Foxglove	*Saxifraga hypnoides* Mossy Saxifrage
Filipendula ulmaria Meadowsweet	*Sedum acre* Biting Stonecrop
Fragaria vesca Wild Strawberry	*Sorbus aucuparia* Rowan
Fraxinus excelsior Ash	*Stellaria holostea* Greater Stitchwort
Galium aparine Goosegrass	*Taraxacum officinale* agg. dandelions
Galium verum Lady's Bedstraw	*Thymus polytrichus* Wild Thyme
Geranium lucidum Shining Crane's-bill	*Trifolium* sp. clovers
Geranium robertianum Herb Robert	*Urtica dioica* Stinging Nettle
Geum rivale Water Avens	*Vaccinium myrtillus* Bilberry
Hedera helix Ivy	*Veronica arvensis* Wall Speedwell
Hieracium sp. hawkweeds	*Viola riviniana* Common Dog-violet
Lamium album White Dead-nettle	

Yorkshire Naturalists at War: Part 2 - on the Home Front

Colin A. Howes, Doncaster
email: colinhowes@blueyonder.co.uk

Following on from Howes (2017), part 2 concentrates on how the Great War affected the routine field work and meetings of the Yorkshire Naturalists' Union and how the time and expertise of Union members was directed in support of the war effort.

WARTIME RESTRICTIONS

Rail discounts discontinued. In 1915 the usual discounted ticket prices afforded the YNU by the Railway Companies were withdrawn owing to the war (Wattam, 1916). This increased the cost of attending YNU Excursions to far flung locations on the railway network in Yorkshire and was deemed to be a contributory cause of relatively low attendances at YNU meetings for the rest of the war.

Wartime ecomomies. In 1917 in accordance with the national call for economy, and having regard to the curtailment of cheap railway fares, the YNU Executive Committee decided that the Excursion programme arranged for 1917 should stand postponed until 1918. The usual autumn sectional AGMs were however held as usual (Wattam, 1918).

In 1918 five Vice County Field Meetings were held whilst observing of the theme of economy. The August Bank Holiday week-end visit to Settle was held jointly with the British Ecological Society and the mycological meeting in Selby on 7 to 12 September was held jointly with the British Mycological Society. Since many YNU members also belonged to these national organisations, the joint meetings had the advantage of convenience and economy. Attendance at these particular gatherings, considering the war conditions, was deemed very satisfactory (Wattam, 1919).

Entomological fieldwork. Referring to 1916, Mr Ben Morley of the Entomological Committee reported that military restrictions had prevented coast and night collecting (Morley, 1917a) and Mr T. Ashton of Lofthouse reported that there had been no 'sugaring' or lantern work owing to military restrictions (Morley, 1917b).

Ornithological Fieldwork. Referring to the North Riding in 1916, Thomas Nelson of the Vertebrate Zoology Section writes "The Military restrictions on the coast are not relaxed and observation of birdlife is rendered extremely difficult" (Nelson, 1917).

Marine Biology Fieldwork. Even after the declaration of war (August 1914) the Marine Biology Committee reported that "Excellent research work has been done by members at Whitby from 18 to 22 September" (Woods, 1915). In fact, few members attended due to the war, cold stormy weather and unsuitable tides, but from those stalwarts who attended an impressive list of taxa was produced (Woods, 1914).

Considering the risk of live ordnance washing up randomly along the Yorkshire coast and enemy shipping operating off-shore, it was understandable that coastal fieldwork eventually lost its usual popularity. Referring to the 1918 season, Dr John Irving of the Marine Biology Committee reported "This committee was unable to arrange a meeting at the coast for scientific investigation" (Irving, 1919).

Indefatigable Field Workers. At the YNU VC62 Excursion to Saltburn during 31 July to 2 August 1915, after the coastal bombardments of Hartlepool, Whitby and Scarborough on 16 December 1914, it was observed that "The dreadful war is still with us ... considering the delightful uncertainties of bombardment by 'my glorious fleet' and Zeppelin raids [there were 20 across Yorkshire 1915 to 1918] the attendance scarcely came up to expectation ... Nevertheless if ever the 'inner history of the war' is written, will there be inscribed upon its pages the names of that brave ineligible host of military members who regarding the honour of the Union as a form of highest culture, were prepared to face any frightfulness of German origin." On that occasion, numbered amongst the 'brave ineligible host of military members' were J.J. Burton, H.B. Booth, Greevz Fysher, T.A. Lofthouse, M.L.Thompson, Miss C.A. Cooper and W.E.L. Wattam (Wattam, 1915).

BOMBARDMENT OF HARTLEPOOL, WHITBY AND SCARBOROUGH 16 DECEMBER 1914: A seismic event

Following reconnaisance by the German submarine *U-17,* which reported little onshore defence around the garrison towns of Scarborough and Hartlepool, no mines within 19km of the shore and a steady stream of in-shore shipping, six surface ships of the Imperial German Navy were dispatched to the Yorkshire and Cleveland coast where, between 08:00hrs and 09:30hrs on the morning of 16 December 1914, they subjected the coastal towns of Hartlepool, Whitby and Scarborough to brief but heavy bombardments (Marsay, 1999; Massie, 2004).

Members of the public living considerable distances (up to 60 miles) from these centres of conflict wrote to the *Yorkshire Post* reporting that, despite a westerly breeze, they had heard and/or felt the concussion of the coastal bombardments and provided anecdotes on the effects on pheasants and wild birds in general. One of the correspondents, YNU member Samuel Margerison of Risplith, Ripon, collated submissions published from 19 to 26 December 1914 and added more from his own enquiries, submitting the results to *The Naturalist* (Margerison, 1915).

Considering the loss of life and scale of human suffering which triggered a huge public outcry and provided the theme of a series of recruitment posters, the paper in *The Naturalist* focussing on windows being rattled and the hysterical behaviour of pheasants seemed insultingly trivial. However, in terms of physics and animal behaviour the project had echoes of modern seismic studies. Also the reported avian hysterics contrasted with the behaviour of the birds inured to bombardment as reported from the Western Front by messrs Corbett and Mitchell (Howes, 2017).

Subsequent plotting of the distribution of the distant locations where the shelling was heard illustrates that these were primarily distributed along the elevated eastern flank of the Magnesian Limestone ridge from Parlington (SE4236) in the south to Gilling West (NZ1805) and Lunedale, Co Durham (NY9524) in the north (see figure 1), a phenomenon which justifies further explanation. Its penetration to Winton, Kirkby Stephen (NY7810) was particularly remarkable being on the western foot of the Pennines, though it was suggested that the route (the Maiden Castle Pass) through which the Darlington to Tebay railway ran could have helped conduct the sound (Margerison, 1915).

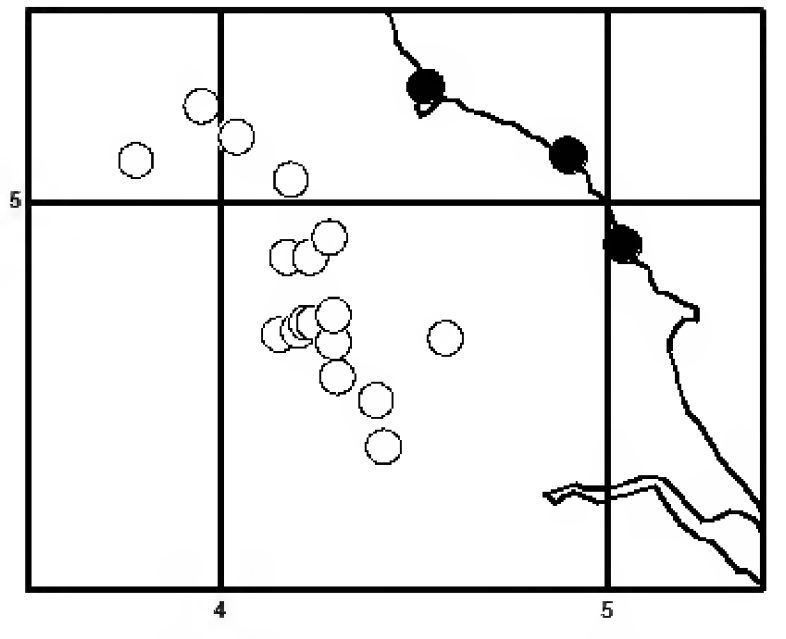

Figure 1: Solid dots = sites of bombardments (north to south) Hartlepool, Whitby and Scarborough. Open circles = locations where sound/tremors of bombardments were experienced.

CAMPAIGN TO KEEP MUSEUMS OPEN DURING THE WAR

The Government's proposal to make savings of around £12,000 a year through the closure of museums during the period of the war unleashed a wave of eloquent and well-researched opposition from museum professionals and representatives of learned societies. The press took up the challenge, giving rise to cartoons in the *Daily Sketch* and the satirical magazine *Punch*. *The Evening News* (February 1916) deftly pointed out that "It is estimated that by closing the museums the nation will save £50,000. This would pay for the war for very nearly a quarter of an hour!"

Thomas Sheppard, as curator of Hull Museum and a representative of The Museums' Association, was heavily involved in the debate and, as YNU editor, devoted eleven pages of *The Naturalist* to the issue (Sheppard, 1916). Of his own involvement he wrote "A few days ago the writer had the honour of taking part in a deputation which was personally received by the Prime Minister the Right Hon. H.H. Asquith KC., MP at 10 Downing Street." The deputation headed by The Museums' Association also included representatives from the National Art Collection Fund, Royal Asiatic Society and Art Workers' Guild, with additional letters of protest from the Royal Society, British Academy, Society of Antiquaries, Geographical Society and the British Association for the Advancement of Science.

The deputation had the satisfaction of learning that the Reading Room of the British Museum, the National Gallery, the Victoria and Albert Museum and the more popular parts of the Natural History Museum, South Kensington, were to remain open and that it was not the intention of the Government to interfere with the work of serious students at the Science Museum and other museums.

Of provincial museums, the result of the deputation was quite satisfactory. It was clearly demonstrated that the cost of the upkeep of museums in the provinces was usually at a minimum, the actual expenses of administration being trivial. Further, that the necessary cost of heating, cleaning, rent, rates, taxes, insurance, interest on loans and the supervision that would be essential in view of the preservation of the specimens if the museums were closed, would leave the actual saving to be so small that the actual loss from the point of view of the public would be greater than the amount gained by closing down.

ORNITHOLOGY

Millitary action affecting water-birds, sea-bird colonies and Peregrine Falcons. In 1915 it was reported that "The Peregrines at Bempton were again disturbed, only one egg apparently being laid. A large steamer which went ashore at Filey was blown up and the charge was so violent as to cause all the birds in the neighbourhood to fly off in thousands, including no doubt, the Falcons. Remains of the eggs were found discarded and forwarded to me" (Wilkinson, 1916).

Hornsea Mere. With the military using Hornsea Mere as a bombing range during the bird breeding season the YNU Vertebrate Section made representations to the military authorities to suspend 'bombing' practice from mid-April to mid-June (Greave, 1917). Evidently the appeal was successful since, during the 1917 season, the Mere was reportedly "... very quiet, there being no bombing; consequently all eggs have hatched well, although the numbers of various birds were smaller than usual" (Wilkinson, 1918).

Aircraft machine-gunning seabird colonies. A correspondent to the *Yorkshire Post* 2 June 1918 reported "I should like to voice a grievance felt by the village of Bempton near Flamborough. At this time of the year, there are many thousands of Guillemots and Razorbills ..... nesting on Bempton Cliffs, and some thousands of eggs are annually gathered by the Bempton Cliff Climbers for food for the village and surrounding districts. Yesterday, in the middle of the afternoon, a seaplane traversed the cliffs from one end to the other (some three miles) firing a machine gun over the entire distance into the cliffs, which had the effect of bringing the birds hurriedly off their eggs, creating a wild avian panic. In the act of hastily leaving the cliffs, hundreds of eggs would be carried off the cliff and wasted ... Again, the exposure of the eggs left them at the mercy of those avian felons the Jackdaws and the Herring Gulls ... Some time ago the Yorkshire Naturalists' Union was successful in preventing the pleasure steamers from Bridlington and Scarborough from firing guns as they passed the Speeton Cliffs in order to let the trippers see the clouds of birds; now we have an 'adjectival' aviator playing the same game, presumably to amuse himself" (Anon., 1918c).

Gulls attracted to waste tips at inland Munitions factory. "At a large munitions works in the West Riding, where thousands of girls and men are employed filling shells, there is a large refuse heap. When the severe weather commenced at the beginning of the year [1917], a few gulls found it out; their numbers rapidly increased until a very considerable flock, chiefly Black-headed and Herring Gulls frequented it regularly every day, and are still there. They evidently found an abundance of food and are loath to leave it, for at the time of writing [7 March 1917] they are as abundant as ever." In the days before municipal landfill sites these inland gull concentrations were unusual (Fortune, 1917).

SEABIRD EGGS FOR HUMAN CONSUMPTION

At a meeting of the YNU Vertebrate Section Birds and Eggs Protection Committee held at the Philosophical Hall, Leeds 17 February 1917, the chairman, Mr H.B. Booth, outlined a seemingly heretical proposal, opening with the statement that "the society for many years had helped the gulls" to the extent that all have increased "out of proportion to the available food supply in late years" so "in this year of threatened food shortage, the gulls could materially help us, without imperilling the numbers of any". It was therefore proposed that Lord Devonport, the Food Controller, be requested to make use of the eggs of the Black-headed Gull *Chroicocephalus ridibundus*, Common Gull *Larus canus*, Herring Gull *Larus argentatus*, Great Black-backed Gull *Larus marinus* and Lesser Black-backed Gulls *Larus fuscus*, Guillemot *Uria aalge* and Razorbill

Alca torda in large and easily accessible colonies (Greaves, 1917).

The watchers at the gulleries, with a little assistance, could regularly collect the eggs for dispatch to larger towns, where they could be retailed much cheaper than those of barnyard fowl. Mr Booth estimated that in this way millions of additional eggs, equal to hundreds of tons in weight, could be brought to market. The proposition was unanimously accepted and the members present offered to place their services at the disposal of Lord Devonport should he require suggestions or advice as to the best methods of collecting and distributing the eggs (Greaves, 1917).

During the 1917 season "it was not until 21st April that we heard that the eggs of the Black-headed Gull could be taken until June 21st. We at once put ourselves in communication with the largest gullery in Yorkshire [Skipwith Common], and through the generosity of the owner, the agent, and watcher, we were able to bring about 1,500 eggs into market, which were sold at 1d. each in Bradford and York. The price in London at the same time was 4s 6d [22½ new pence] per doz. We were much disappointed at the quantity of eggs as we fully expected between four and five thousand, but the usual numbers of birds were not there. Another Gullery of between four and five hundred birds yielded nearly three hundred eggs, which were taken but not sold. It is satisfactory to know that we have provided a number of eggs for poor people; the small balance in hand after payment of expenses was given to the gatherer" (Anon, 1918a).

The Journal of the Board of Agriculture for February 1918 gave short descriptions of the various wild birds' eggs which it proposed should be collected and used for food. The birds whose eggs were to be gathered were: Black-headed Gull, Herring Gull, Lesser Black-backed Gull, Common Guillemot, Razorbill and Puffin *Fratercula arctica*. Probably every seaboard county of England and Wales except Suffolk had gulleries but of the inland counties it was believed that there was a gullery only in Staffordshire where the Black-headed Gull bred. Nests of the last mentioned were often found in inland localities and as a rule, were readily accessible, and it was this bird which was expected to yield the bulk of eggs put on the market.

A list of the chief species and breeding places cited for Yorkshire and Lincolnshire were:

> Lincolnshire: Black-headed Gull (Brigg and Twigmoor).
>
> Yorkshire: Black-headed Gull (Skipwith Common, Locker Tarn, Brownsholme Tarn and Grassington); Herring Gull, Razorbill and Guillemot (Chalk Cliffs from Speeton to Bempton, Flamborough head) and Puffin (Flamborough cliffs) (Anon., 1918b).

Many more Black-headed Gull breeding sites were known to YNU members, these being reviewed in Booth (1921) who recalled that "during the leanest years of the war ... large numbers of these gulls' eggs were collected for human food, with the consent of the Law". Wartime collecting sites additional to those listed in the government document included White Home or Soyland Moor, where about 300 eggs were collected one May during the War (Fred Taylor, pers. comm.) and at Foul Syke Mere, Fylingdale Moor, where eggs were regularly collected in 1917 (F. Snowdon, pers. comm.). Mr Snowden also noted that "in 1917 and after, the eggs appear to have been taken on a wholesale scale" (Booth, 1921).

Historically, the Black-headed Gull has been one of the main European birds exploited for its eggs as a food source, particularly in the British Isles, Holland and Denmark (Cott, 1953; 1954).

Plate 1. An overview of canals and their plants (see pp161-176).

Top left: Pocklington Canal, June 2015; Flowering-rush colonizing the recently cleared channel between retained margins of Reed Sweet-grass.

Top right: Grantham Canal, July 2015; Water-soldier aggressively out-competing more or less all other submerged and floating-leaved plants.

Centre: Cromford Canal, August 2015; a mosaic of light and shade produced by selective tree clearance has encouraged a diversity of aquatic plants.

Left: Cromford Wharf, September 2015; the canal is a popular public amenity as well as a valuable resource for plant conservation.

R.Goulder

Plate 2. Mass mortality of Common Toads *Bufo bufo* (see pp178-190)

2a. Toad photographed as found lying on its back (Askham Bog, April 2016). R.O. Shillaker

2b. Large clump of Common Toad carcasses on bank (Askham Bog, March 2017). S.M. Roberts

2c. Common Toad carcass with three degloved limbs (Ellerker pond, March 2017). R.O. Shillaker

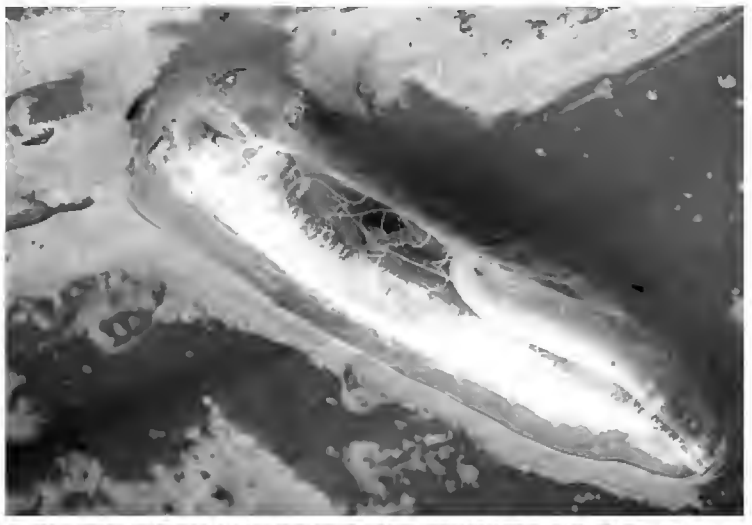

Plate 3. The first Yorkshire record of the hoverfly *Callicera rufa* (see pp211-213).

Above: *Callicera rufa* adult Nigel Jones

Above right: *Callicera rufa* larva Ken Gartside

Right: Rot-holes cut into a Pine stump Ken Gartside

Plate 4. Red-veined Darter dragonfly *Sympetrum fonscolombii.* See p203.

Left: Immature dragonfly photographed at Tom Pudding Flash. Peter Kendall

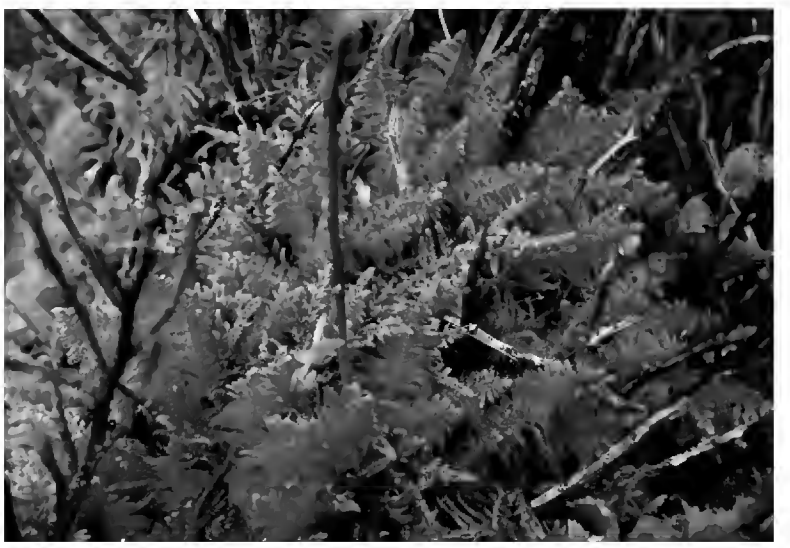

Plate 5. Bryological Section report (see p205).

Above left: A dry crust of the liverwort *Gymnomitrion obtusum* at Holwick Scar. Tom Blockeel

Above right: The moss *Cynodontium bruntonii* at Holwick Scar. Tom Blockeel

Left: The moss *Ptilium crista-castrensis* growing among Bilberry *Vaccinium myrtillus* on Ilkley Moor. Tom Blockeel

Plate 6. YNU Excursion to Aysgarth Freeholders' & St. John's Wood/Riddings Field (VC65). Normal (left) and unusual (right) forms of Wood Sedge *Carex sylvatica* (see p226). Ken White

Plate 8. YNU Excursion to Eastrington Ponds (VC61) (see p222).
Left: Spiked Water-milfoil *Myriophyllum spicatum*. *Top right*: Clouded Border moth *Lomaspilis marginata. Lower right:* Blue-tailed Damselfly *Ischnura elegans.* Ken White

Plate 9. YNU Excursion to Dunford Bridge (VC63) (see p235).
Top Left: Alder Tongue gall *Taphrina alni.*
Above right: Tortoise beetle *Cassida rubiginosa*, disguised by its own frass.
Left: YNU members (including Don Grant (centre)) were joined by Sorby members (including their Vascular Plant Recorder, Roger Butterfield (right)).

Joyce Simmons

YORKSHIRE SEAWEEDS AS SUBSTITUTE FOR ISINGLASS AND GELATINE

In the autumn of 1918 attempts were made by the YNU Marine Biology Committee at the behest of The Government Food Production Department to collect and bleach to whiteness the so-called Irish or Carrageen Moss – two allied red seaweeds, *Chondrus crispus* and *Gigartina mamillosa*, which abounded on the Yorkshire coast. The Department was anxious to secure supplies as a substitute for isinglass and gelatine for use in Red Cross hospitals. "Collecting parties have been organised at Whitby and Sandsend by Mr J.T. Sewell, J.P.; at Scarborough and Carnelian Bay by the writer [John Irving]; and at Filey by Cannon Cooper. Thus the energies of the Marine Biological Committee are diverted for the time being" (Irving, 1919).

The practical difficulties of this public-service exercise were humorously described by Dr Irving (1918) "Like a bolt from the blue, while the Scarborough season is at its height, when every man, woman and child has barely time enough to sleep, the authorities at the Food Production Department call upon us to denude the rocks, for miles, of certain sea-weeds, popularly known as Irish, or Carrageen moss; to wash, bleach, dry and forward them to London, adding the characteristic remark that it is essentially a *labour of love*. Those who are acquainted with our rocks and know, by experience, the height of the cliffs, will appreciate the word *labour*. A prominent official of the Yorkshire Naturalists' Union, in commending this work, said he thought it was one way in which a naturalist could do his 'bit.' If we had him here, we should certainly give him a chance, and would, with much pleasure, watch him careering over the outer rocks of Carnelian Bay judiciously picking clumps of weeds, cramming them into a sack till the sack becomes a firm cylinder measuring approximately a yard in length and half a yard in diameter. On a fine sunny day the process so far might be to him a labour of love, but he has to return with a burden, progressively growing more burdensome, oozing slimy sea-water, now into one shoulder, now into the other, and by the time he has negotiated awkward rocks, boulders and pools, climbed a two hundred and fifty foot cliff, and walked three miles to the nearest dump, 'labour' consciously takes the precedence of 'love,' and the 'bit' looms large. Let him repeat this performance day after day, and he will assuredly come to the conclusion that the 'labour' is somewhat outside the scope of the naturalist, whatever his speciality may be. A lawn has been suggested as a satisfactory dumping ground where the weeds – and there are tons of them – are to be spread out *thinly*, exposed to the sun and rain, fencing by netting (if necessary) against winds which blow, and, as weeds only bleach when kept thoroughly wet, if rains ceased to deluge then a hose or watering-can must be called into play. They are to be regularly turned over, watched till *ivory white*, then cleansed, dried, packed, and sent by rail. If anyone does all this he accomplishes a labour of love, and is worthy of thanks!"

"Scarborough actually made a start the other day. Twenty collectors, including naturalists of both sexes and children, turned up with a variety of receptacles such as paper bags, fish-bags, small flower-baskets and long sacks. The man with the sacks did most of the work! Next day there was only one collector, the man with the sacks, a keen naturalist undoubtedly doing his 'bit.' "

"He had secured the services of five or six boys and girls to help him to pick and fill his bags. Where were the so-called enthusiasts? The Chairman of the Yorkshire Marine Biology Committee is expected to serve as Divisional secretary, find collectors, and organize them, not for scientific research, but to produce jelly! It is a new departure! Needs must. Invalid soldiers and sailors in our Red Cross hospitals require comforts in the shape of jellies".

GOVERNMENT REQUESTS FOR EXPERTISE ON MOSQUITOES

"The Medical Department of the Local Government Board have asked for the assistance of members of this Entomological Committee regarding the movements of *Anophelines* [Mosquitoes] in connection with the possible risks of malaria being acquired in this country. The circular sets forth the nature of the records required and copies can be obtained by writing to the Medical Department of the Local Government Board" (Morley, 1918).

GENERAL WARTIME NOTES

Culling animals at London Zoo. "At the Annual Meeting of the Zoological Society ... it was stated that the total numbers of animals had been very greatly reduced, partly because the large animals that had died during the war had not been replaced, and partly because many animals which could be replaced in normal times had been destroyed. There was a corresponding reduction in the consumption of food and the principle had been adopted of using only food unsuitable for human consumption" (Anon., 1917).

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Field Note: Red-veined Darter in a Flash

Peter Hinks
Email: Peteh1357@outlook.com

After a new road (Tom Pudding Way) was built west of Goole linking the docks with the M62 motorway in 2015, a marshy area at SE7223 remained on land reserved for development. By 2016 a substantial area of shallow water persisted there throughout the year and limited observations of the site that year produced sightings of Black-tailed Skimmer *Orthetrum cancellatum*, Broad-bodied Chaser *Libellula depressa* and Emperor *Anax imperator* Dragonflies.

In 2017 I included the shallow water, now named 'Tom Pudding Flash', in my regular recording days around the nearby Brick Ponds (SE7322) and Oakhill Nature Reserve (SE7222/ 7122/ 7121). Seeing the potential for Odonata I advised other naturalists and on 20 June Brian Smith and his son Mark observed and took photographs of a mature male Red-veined Darter *Sympetrum fonscolombii*. What was assumed to be the same individual was seen by me and Paul Adams over the next few days (see Plate 4, centre pages).

On 8 September I was delighted to find 3 teneral Red-veined Darters in the vegetation around the edge of the flash. I was aware that this dragonfly can sometimes produce two generations a year, as egg laying to emergence can apparently be accomplished within three months! In a flash! --- had we missed other individuals in June? Was there a possibility of breeding?

In the rest of September and until 5 October Tom Pudding Flash produced sightings of tenerals of Red Veined Darter on most days, numbers ranging from three to thirteen, with many days in double figures. On 22 September I observed two recently emerged Red-veined Darters perched on Reedmace *Typha latifolia* with their exuviae visible below but as I didn't have suitable footwear they were impossible to collect and the next day they were gone. Mature Red-veined Darters were not seen in September or October so it seems that all had dispersed away from the site within days of emergence.

From June to October 2017 sixteen species of Odonata were seen at the flash, twelve of which were making use of the site by ovipositing. I shall watch this area in 2018 with great interest.

YNU Conchological Section Report for 2017

Terry Crawford (Chairman) & **Adrian Norris** (Recorder)
Email: terryjcrawford@btinternet.com

During 2017, to the end of October, 428 1km square species records have been added to the Yorkshire non-marine mollusc database. These comprise 76, 70, 130, 46 and 106 records for VC61–VC65, respectively, made up of 38 records of freshwater molluscs and 390 of terrestrial. These figures are provisional, however, as our files run until the end of December, when most records are submitted; thus, 2016 records totalled 1,351 at the year-end. The outstanding record this year is of the Ghost Slug *Selenochlamys ysbryda* collected by Victor Soria-Corrassca of Sheffield University from Redcar Road, Sheffield on 25 September (SK33328731) identified by Ben Rowson (National Museum of Wales).

Conchologists attended and reported on all YNU VC Field Excursions except that to Aysgarth (VC65) on 10 June when none of us was available. Instead, we held an unscheduled Yorkshire Conchological Society (YCS) meeting at Aysgarth/Redmire on 6 August. Here we recorded Mountain Whorl Snail *Vertigo alpestris* and Wall Whorl Snail *Vertigo pusilla* on old walls in Freeholders' Wood and at Low Bolton, respectively, both confirming older records in the paper by the late David Lindley (2016). We described our day for a contribution to the Field Excursions report for *The Naturalist* only to discover that the reporting meeting on June 10 was abandoned because of extremely wet weather! All four scheduled YCS/sectional field meetings were held as planned. Many useful records were obtained, and a very positive feature was that our ranks were swollen at one or more meetings by naturalists from the Freshwater Ecology Section, Craven Conservation Group, Whitby Naturalists' Club and the Yorkshire Dales National Park.

Two of us helped at the YNU/Leeds University Training Day at St Chad's, Headingly, Leeds. Other activities by the section have included one-off visits or ongoing surveys in Yorkshire or further afield, for example Co. Durham and the Lake District, the latter confirming an old record for Lilljeborg's Whorl Snail *Vertigo lilljeborgi*. Most extensive was a one-week expedition to Galloway, Scotland in October 2017, which resulted in 340 records (216 from Kirkcudbrightshire and 124 from Wigtownshire). Among these are at least two new County Records including the Balkan Threeband Slug *Ambigolimax nyctelius* and the Quick Gloss Snail *Zonitoides arboreus*, both introduced greenhouse aliens. This followed a very successful trip in October 2016 to Northumberland (part-funded by Environmental Records Information Centre North East) to help to establish the size and scale of the newly-recorded colony of the frost-sensitive Sandhill Snail *Theba pisana*. After achieving this we also made some 264 other records, 223 from VC67 and 41 from VC68. In both Northumberland and Galloway we obtained quite a large number of records of the little-known Tawny Soil Slug *Arion owenii*, and we were regularly impressed by its relative abundance, where it occurred, compared to the usually common Brown Soil Slug *Arion distinctus*.

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YNU Bryological Section Report for 2016

T.L. Blockeel 9 Ashfurlong Close, Dore, Sheffield S17 3NN
email: Tblockeel@aol.com

Excursions

Two sectional meetings were held in 2016 and are reported below. Nomenclature follows the current British Checklist and Census Catalogue (Hill *et al.*, 2008).

Holwick Scars, Upper Teesdale (VC65) 7 May 2016

The Bryological Section held a very successful meeting in Upper Teesdale in 2013 at Cronkley Scars, when a number of very old records were refound and some new ones made. In view of the general lack of recording in the VC65 part of Teesdale in recent decades it was decided to follow up the Cronkley meeting with a visit to another classic locality, Holwick Scars. Our visit was limited to the crags, screes and flushes in the immediate vicinity of the scars and, therefore, the ground covered was less extensive and more uniform than at Cronkley. Nevertheless several interesting records were made.

An early find in boulders in the scree was *Kiaeria blyttii*, recorded at Holwick in 1843 by Richard Spruce. It is also known nearby at Cronkley, where it was confirmed during the 2013 meeting. It is a montane moss, widespread in Scotland, the Lake District and North Wales but very restricted in the Pennines and not occurring south of Teesdale. The altitude at Holwick is remarkably low for a montane bryophyte at the south-eastern edge of its range. Three British species of *Kiaeria* have been reported in Teesdale in the past but it seems likely that all these records actually refer to *K. blyttii*. The other two species (*K. falcata* and *K. starkei*) are more markedly montane in distribution, with only a few isolated localities south of the Scottish Highlands.

There were a few scattered tufts of *K. blyttii* but it was not present in great quantity. The boulders in the scree were largely dominated by *Racomitrium* species, especially *R. lanuginosum*, and there were numerous tufts of *Andreaea rupestris* and *Marsupella emarginata*. *Ptilidium ciliare* was widespread on boulders and rock ledges. The distinctive liverwort *Gymnomitrion obtusum* (see Plate 5, centre pages) formed grey crusts on the rocks in a few spots, especially on the sides of large and presumably stable boulders. Like *Kiaeria blyttii*, *G. obtusum* is confined to the mountainous parts of Britain and Cronkley and Holwick are its only sites in the Yorkshire vice-counties. Other bryophytes with scattered occurrences in the scree included *Mylia taylorii*, *Scapania gracilis* and *Tritomaria quinquedentata*. There was some overlap between the screes and the crags but several species were more common on the crags. These included *Racomitrium aquaticum* and *Frullania tamarisci*. There was a good quantity of *Cynodontium bruntonii*, typically in crevices on the crags (see Plate 5, centre pages). In spite of the strong population there, it had not been reported at Holwick or anywhere else in VC65 since 1949. *Rhabdoweisia crispata* was present on thin soil in recesses on the crags, and *Bartramia pomiformis* was frequent. *Diphyscium foliosum* was sparse and sterile. *Sanionia uncinata* was found in short turf, *Tetraplodon mnioides* on animal remains and *Pohlia cruda* in earthy crevices.

The crags and screes were very dry at the time of our visit but there was moisture in the gullies and seepages. Bryophytes of these moister habitats included *Amphidium mougeotii*,

Blindia acuta, *Blepharostoma trichophyllum*, *Heterocladium heteropterum*, *Lejeunea cavifolia*, *L. lamacerina* and *Metzgeria conjugata*. The banks of the Scar Beck at the western end of the scar were more base-rich in places than the adjacent crags and produced *Preissia quadrata*, *Tortella tortuosa* and *Trichostomum brachydontium* on the rocks, *Climacium dendroides* in turf and even a little *Cinclidotus fontinaloides* in the stream. *Schistidium platyphyllum* was in the beck further to the east. Flushed ground on the slopes near the beck had *Breutelia chrysocoma*, *Palustriella commutata* and, in one place, some fine beds of *Plagiomnium elatum*. *Sphagnum* species on the steep banks included *S. girgensohnii* and *S. russowii*.

There are only a few trees on and below the Scar but *Orthotrichum pumilum* was a notable find on Sycamore. This is one of our very scarce *Orthotrichum* species with only one other recent record in the vice-county. A wall under another Sycamore had *Orthotrichum stramineum* and *Ulota phyllantha* on its stones, an unusual occurrence of mosses normally growing as epiphytes on bark.

The total number of species recorded was 104, mostly in tetrad NY92D.

Caseker Gill, Kettlewell (VC64) 8 October 2016
The Kettlewell district is fairly well known for its bryophytes but the Caseker area was chosen for our autumn meeting because it appeared to be poorly recorded and it had the advantage of rising through the limestone up to gritstone crags within a short distance. The approach to the foot of the gill took us through some ungrazed areas where the growth of rank grasses was suppressing bryophytes of open habitats. We saw a very little *Entodon concinnus* but it is unlikely to persist there under present conditions. There were some small flushed banks where we found *Campylium protensum* and *Hymenostylium recurvirostrum*, as well as *Preissia quadrata* and *Philonotis calcarea* on the banks of the beck.

Caseker is a relatively small gill but we found many of the classic bryophytes of the Dales limestone, including *Cololejeunea calcarea*, *Metzgeria pubescens*, *Pedinophyllum interruptum*, *Fissidens rufulus*, *Mnium thomsonii* and *Orthothecium intricatum*. One rock face, clearly wet under normal conditions, had an abundance of *Seligeria trifaria* s.lat. Capsules were present but were empty. A very few residual spores suggested that the plant might be the small-spored segregate *S. patula* but this could not be confirmed with certainty. *Seligeria donniana* was also present along with a third species of the genus, probably *S. pusilla* but without capsules. *Climacium dendroides* was very fine in places in the turf.

Above the gill, on the slopes of Great Whernside, we reached Caseker Crag, a cliff of Millstone Grit with small areas of adjacent scree. *Racomitrium lanuginosum* was frequent on the scree and *Tetraplodon mnioides* covered an old sheep skull. *Polytrichastrum alpinum* was a nice find among the rocks and one patch of bouldery ground had some purple mounds of the distinctive leafy liverwort *Mylia taylorii*. Gritstone crags are often poor in bryophytes but Caseker Crag had plentiful *Andreaea rothii*, *Racomitrium heterostichum* (in the obtuse-leaved form sometimes recognised as *R. obtusum*) and some tufts of *Dicranoweisia cirrata*. Surprisingly, there was also a small amount of the normally epiphytic liverwort *Frullania dilatata*. Other records on the rocks nearby included *Barbilophozia atlantica* (with gemmae), *Ptilidium ciliare*, *Andreaea rupestris* and a little *Leptodontium flexifolium* on thin peaty soil.

Both the Gill and the Crag are in tetrad SD97X, and the total number of species recorded in the tetrad was 124.

The year's records

The number of records received in 2016 from each of the Watsonian vice-counties is shown below.

Vice-county	Records received
61	1
62	3
63	1930
64	2745
65	456

The focal points for records once again have been Nidderdale and Wharfedale, thanks to the efforts of Nick Gaunt and Gordon Haycock respectively, but Johnny Turner has also done some intensive recording in Colden Clough near Hebden Bridge in Upper Calderdale, with remarkable results. He has discovered a new site for *Ptilium crista-castrensis*, a handsome boreal forest moss which is very rare in England outside the Lake District. In 2013 Johnny found it at Lumbutts Clough near Todmorden on an inclined tree trunk, but the habitat at Colden is more typical for this species, among ericaceous shrubs in woodland. *Loeskeobryum brevirostre*, another scarce, robust forest moss, was found nearby, the first record in VC63 since the 19th century. The site at Colden was damaged by fire some years ago and the woodland where these mosses occur consists of a young growth of birch and oak. It seems that the *Ptilium* and *Loeskeobryum* have been able to colonise the regenerating woodland. Interestingly, *Loeskeobryum* is a rare colonist of post-industrial sites, though new populations rarely appear in closed habitats in mature woodland. A few years ago *Ptilium crista-castrensis* was found at a new site on Ilkley Moor and two separate patches were located there in 2016 during a meeting of the North-western Naturalists Union. *Ptilium* was not recorded on Ilkley Moor during Mary Dalby's surveys some 50 years ago (Dalby, 1963) and it is evidently a recent arrival there too. The sites in Calderdale and on Ilkley Moor are the only ones currently known in Yorkshire (see Plate 5, centre pages). The most recent previous record was in the 1970s at Hebblethwaite Gill in VC65, and it could perhaps still be present there.

Another remarkable find by Johnny Turner at Colden Clough is the 'thatch moss' *Leptodontium gemmascens*. It derives its vernacular name from its occurrence on thatched roofs in southern England, though it has also been recorded a few times on decaying grass. It has never previously been found north of Suffolk and its presence in the Pennines is therefore astonishing. At Colden Clough it occurs on decaying grass and acid humus at the base of a wire fence bordering the woodland where *Ptilium* and *Loeskeobryum* grow. It was thought initially that the Colden plants might belong to *L. proliferum*, an exotic species recorded from a single British site on a bowling green in Lancashire, and indeed they show some intermediate features in their morphology. However the Yorkshire plants undoubtedly belong to *L. gemmascens*.

Epiphytes continue to provide interest, not least because of their ability to respond rapidly to environmental and climatic change. It is some years now since *Colura calyptrifolia* and *Cololejeunea minutissima* began to spread eastwards and to colonise former industrial regions. This process continues and *C. minutissima* has now reached NE Yorkshire. *Colura* has an

Atlantic distribution in Europe and it is restricted to the western parts of Yorkshire, but is now widespread there. *Microlejeunea ulicina* is also being found in new localities in western regions. There has been a taxonomic change affecting one of our common epiphytes, *Ulota crispa*. It is now known to consist of three distinct species, *U. crispa* s.str., *U. crispula* and *U. intermedia*. All three occur in Yorkshire but it will be some time before their relative frequencies are known. Their identification is discussed in a recent article in *Field Bryology* (Blockeel, 2017).

The list below provides details of selected records, including new vice-county records and updates to the national Census Catalogue (identified by an asterisk). The vice-county is given in brackets before each individual record. There are three new vice-county records (*Atrichum tenellum*, VC64, *Cololejeunea minutissima*, VC62, *Lophocolea semiteres*, VC64), and two vice-county updates, i.e. first post-1960 records (*Cynodontium bruntonii*, VC65, *Loeskeobryum brevirostre*, VC63), as well as three records of the newly recognised *Ulota* species.

Atrichum tenellum: (64*) SE1427858100 margin of reservoir, Thruscross, M. Wilcox, 13 August 2016. Second Yorkshire record of this scarce moss that occurs on bare, moist acidic ground, a habitat often found by Pennine reservoirs.

Bryum elegans: (64) SD91626410 limestone rocks, Gordale Scar, T.L. Blockeel & J. Turner, 19 April 2016. A characteristic moss of upland limestone, but with few recent records and probably under-recorded.

Bryum gemmiferum: (64) SE27985439 soil, Harlow Carr and Birk Crags, P.N. Gaunt, 10 February 2016; (64) SE44925411 Cattal, P.N. Gaunt, 31 March 2016.

Cephalozia lunulifolia: (63) SD92 Colden Clough, Hebden Bridge, J. Turner, 2016. A small leafy liverwort occasionally found in the South Pennines on and among gritstone rocks in woodland and other sheltered places.

Cololejeunea minutissima: (62*) SE57239480 on oak on bank by road, Fangdale Beck, J.D. Shanklin, 5 September 2015; (63) SD998048 and SD9803 Diggle loop, A. & N. Bamforth, 14 March 2014; (63) SD92 Colden Clough, Hebden Bridge, J. Turner, 2016; (64) SE3646 one patch on Ash tree, East Keswick (Ox Close Wood and R. Wharfe), T.L. Blockeel *et al.*, 16 November 2016; (64) SE09367343 on bark of Sycamore, How Stean, P.N. Gaunt, T.L. Blockeel & M. Adamson, 23 May 2016.

Cololejeunea rossettiana: (64) SE08687397 natural rock, How Stean, P.N. Gaunt, T.L. Blockeel & M. Adamson, 23 May 2016. A tiny leafy liverwort of calcareous rocks, last recorded at How Stean in 1986.

Colura calyptrifolia: (63) SE008046 on willows, Dick Clough SBI, A. & N. Bamforth, 7 June 2013; (63)SE0007 Diggle Field, A. & N. Bamforth, 21 March 2014; (63) SD92 Colden Clough, Hebden Bridge, J. Turner, 2016.

Conocephalum salebrosum: (64) SE09377353 natural rock (calcareous), How Stean Gorge, P.N. Gaunt & M. Adamson, 7 July 2016; (64) SD9164 Gordale Scar, T.L. Blockeel & J. Turner, 19 April 2016. This segregate from the common and well-known *Conocephalum conicum* (Great Scented Liverwort) remains poorly recorded.

Cynodontium bruntonii: (65*) NY90202695 rock crevices on dolerite crag, Holwick Scar, Teesdale, T.L. Blockeel & YNU, 7 May 2016.

Dicranella rufescens: (64) SE1146 in abundance on eroding banks, Spicey Gill, Ilkley Moor, T.L. Blockeel, G. Haycock & NW Naturalists, 12 November 2016.

Didymodon spadiceus: (64) SE3646 large stone on bank of R. Wharfe, Ox Close Wood, East Keswick, T.L. Blockeel *et al.*, 16 November 2016. A frequent moss on stream banks in the limestone dales but here occurring at a low altitude in lower Wharfedale.

Discelium nudum: (64) SE1146 in abundance on eroding banks, Spicey Gill, Ilkley Moor, T.L. Blockeel, G. Haycock & NW Naturalists, 12 November 2016. This very distinctive moss of bare, acidic clay-shale banks is widely recorded in the Pennines, where most of its British records are concentrated. It has not been recorded recently from many of its known sites, though this is probably a symptom of under-recording rather than decline.

Ephemerum minutissimum: (64) SE3746 in stubble field, East Keswick, T.L. Blockeel *et al*., 16 November 2016. One of our smallest mosses, colonising moist bare soil.

Fissidens bryoides var. ***caespitans***: (63) SD92 Colden Clough, Hebden Bridge, J. Turner, 2016. Second record for VC63. It was found at Hardcastle Crags in 2012.

Fissidens exilis: (63) SE13 Great Horton, Bradford, M. Wilcox, 5 November 2016. Although not rare, this inconspicuous *Fissidens* is easily overlooked and there are rather few recent records.

Heterocladium wulfsbergii: (63) SD92 Colden Clough, Hebden Bridge, J. Turner, 2016. Second record for VC63. It was found by the Hebden Water in 2014.

Leptodontium flexifolium: (64) SE15836713 Wath, P.N. Gaunt, 21 July 2016.

Leptodontium gemmascens: (63*) SD973280 on rotting grass and peaty soil below fence on bank in birch/oak woodland, Colden Clough, Hebden Bridge, J. Turner, 27 September 2016.

Leucodon sciuroides: (64) SD90116268 on trunk of Ash tree, Malham Beck, Malham, T.L. Blockeel & J. Turner, 19 April 2016; (64) SE09727334 drystone wall, How Stean, P.N. Gaunt, T.L. Blockeel & M. Adamson, 23 May 2016. A scarce moss in Yorkshire, more often found on rocks and walls than on trees. As an epiphyte it is characteristic of mature tree trunks, as at Malham.

Loeskeobryum brevirostre: (63*) SD973280 in young birch scrub on north-facing woodland bank, with *Sphagnum quinquefarium* and *Rhytidiadelphus loreus*, Colden Clough, Hebden Bridge, J. Turner, 27 September 2016.

Lophocolea semiteres: (63) SD9906 Brownhill area, A. & N. Bamforth, 7 October 2011; (63) SE0420 on banked wall near garden, Ripponden, A. & N. Bamforth, 24 February 2012; (64*) SE3646 on rotting wood, East Keswick, Ox Close Wood, T.L. Blockeel *et al*., 16 November 2016. An exotic liverwort becoming rather frequent in parts of SW Yorkshire, also known from VC61 and 62 and now found in VC64.

Metzgeria consanguinea: (64) SE08687396 How Stean, P.N. Gaunt, T.L. Blockeel & M. Adamson, 23 May 2016; (64) SE08617406 bark of Hazel, Middlesmoor, P.N. Gaunt & T.L. Blockeel, 23 May 2016. An epiphytic liverwort, much less common than the similar and often abundant *M. violacea*.

Microbryum davallianum: (63) SE50361740 limestone rocks with shallow soils, Snail Crag, Brockadale Nature Reserve, S.J. Heathcote, 19 December 2016; (64) SE3645 and SE3646 stubble fields, East Keswick, T.L. Blockeel *et al*., 16 November 2016. A tiny moss colonising bare and usually base-rich soil, scarce in Yorkshire.

Microlejeunea ulicina: (63) SD990088 Hull Brook SBI, A. & N. Bamforth, 31 May 2013; (63) SD9806 Delph railway, A. & N. Bamforth, 1 July 2015; (63) SE0003 Bradbury Intakes area, A. & N. Bamforth, 26 September 2014; (63) SD92 Colden Clough, Hebden Bridge, J. Turner, 2016.

Mnium marginatum var. ***marginatum***: (64) SE33115801 natural rock, Nidd Gorge, P.N. Gaunt *et al.*, 23 June 2016; (64) SD91446431 Gordale Scar, T.L. Blockeel & J. Turner, 19 April 2016.

Odontoschisma sphagni: (64) SE1260 Humberstone Bank Farm, G. Haycock, 1 July 2016.

Orthotrichum rivulare: (64) SE45115392 on willow, Tockwith, P.N. Gaunt, 31 March 2016. This riparian moss grows on tree roots and boulders by upland streams and rivers. Nick Gaunt's records have shown that it is widespread along the Nidd.

Orthotrichum sprucei: (64) SE44925411 Cattal, P.N. Gaunt, 31 March 2016; (64) SE3646 riverside trees, East Keswick, Ox Close Wood by R. Wharfe, T.L. Blockeel *et al*., 16 November 2016. Like *O. rivulare*, a riparian moss but normally found on silty tree roots and bases in the middle and lower reaches of our rivers, subject to occasional flooding.

Orthotrichum stramineum: (63) SD92 Colden Clough, Hebden Bridge, J. Turner, 2016; (64) SE09727333 on Ash, How Stean, P.N. Gaunt, T.L. Blockeel & M. Adamson, 23 May 2016, and SE09357349 on Beech, How Stean Gorge, P.N. Gaunt & M. Adamson, 7 July 2016; (64) SE0874 on Hazel, Middlesmoor, P.N. Gaunt & T.L. Blockeel, 23 May 2016; (64) SE28715483 Harlow Moor, P.N. Gaunt, 4 February 2016. An epiphytic moss, *O. stramineum* is rather frequent in the Dales but also occurs occasionally in the lowlands.

Orthotrichum striatum: (63) SD92 Colden Clough, Hebden Bridge, J. Turner, 2016.

Orthotrichum tenellum: (63) SD92 Colden Clough, Hebden Bridge, J. Turner, 2016; (64) SE1146 base of oak tree, Spicey Gill, Ilkley Moor, T.L. Blockeel, G. Haycock & NW Naturalists, 12 November 2016.

Pedinophyllum interruptum: (64) SE08717384 on limestone, How Stean, P.N. Gaunt, T.L. Blockeel & M. Adamson, 23 May 2016, and SE0973 How Stean Gorge, P.N. Gaunt & M. Adamson, 7 July 2016. A scarce leafy liverwort of moist, shaded calcareous rocks, characteristic of the limestone dales and last recorded at How Stean in 1986.

Porella arboris-vitae: (64) SE08687397 How Stean, P.N. Gaunt, T.L. Blockeel & M. Adamson, 23 May 2016. A leafy liverwort of calcareous and other base-rich rocks with occasional localities in the Dales but not previously recorded from Nidderdale.

Ptilidium pulcherrimum: (63) SD92 Colden Clough, Hebden Bridge, J. Turner, 2016. An epiphytic liverwort, occurring only on acidic bark. Unlike most of our epiphytes, which have benefitted from reductions in SO_2 pollution, *P. pulcherrimum* has become less frequent in recent decades and is very scarce.

Ptilium crista-castrensis: (63) SD92 Colden Clough, Hebden Bridge, J. Turner, 2016; (64) SE1056745690 and SE1058545779 north of Whetstone Gate, Ilkley Moor, T.L. Blockeel, G. Haycock & NW Naturalists, 12 November 2016.

Sarmentypnum exannulatum: (64) SE1360 Humberstone Bank Farm, G. Haycock, 4 July 2016.

Scapania scandica: (63) SE0003 Bradbury Intakes area, A. & N. Bamforth, 26 September 2014. There are very few recent records of this small liverwort of moist acidic soil.

Scapania umbrosa: (63) SD92 Colden Clough, Hebden Bridge, J. Turner, 2016; (64) SE27335435 natural rock, Harlow Carr and Birk Crags, P.N. Gaunt, 14 April 2016. A small leafy liverwort, in the Pennines most often found on moist gritstone rocks.

Schistidium elegantulum: (64) SD91696366 limestone rocks, Cross Field Knots, Gordale, T.L. Blockeel & J. Turner, 19 April 2016. This and the next species are segregates of the former *S. apocarpum* s.lat. and are still much under-recorded.

Schistidium robustum: (64) SD9164 limestone rocks, Gordale Scar, T.L. Blockeel & J. Turner, 19 April 2016.

Schistostega pennata: (63) SD92 Colden Clough, Hebden Bridge, J. Turner, 2016. This rather rare but well-known luminescent moss ('Goblin Gold') has been recorded from several places in Upper Calderdale but not previously from Colden Clough.

Scorpidium scorpioides: (64) SD9268 High Cote Moor, Littondale, G. Haycock, 16 September 2016.

Seligeria donniana: (64) SE09437345 natural rock (calcareous), How Stean Gorge, P.N. Gaunt & M. Adamson, 7 July 2016. This minute moss of moist, shaded calcareous rocks was last recorded at How Stean in 1986.

Sphagnum quinquefarium: (63) SD92 Colden Clough, Hebden Bridge, J. Turner, 2016. A *Sphagnum* of moist woodland banks rather than mires, it is remarkably abundant in Colden Clough.

Tetraplodon mnioides: (65) SD9396 Spout Gill Mine, S. Knight, 5 May 2016; (65) NY8298 Sleddale, SK, 18 July 2016. A distinctive moss of organic animal matter, especially old bones.

Thamnobryum maderense: (63) SD92 Colden Clough, Hebden Bridge, J. Turner, 2016. A problematic moss, which may be a distinct species or merely a form of the common *T. alopecurum*. Its status is unlikely to be resolved without molecular analysis.

Tortula marginata: (64) SE44215829 Whixley, P.N. Gaunt, 30 June 2016. A scarce moss in Yorkshire, occurring mainly in southern and eastern regions.

Tritomaria quinquedentata: (64) SE1552 Timble Ings, G. Haycock, 16 November 2016; (64) SE1046 Spicey Gill, Ilkley Moor, T.L. Blockeel, G. Haycock & NW Naturalists, 12 November 2016. Though frequent in the Dales, this leafy liverwort is rather rare on the Millstone Grit.

Ulota crispa *sensu stricto*: (62*) SE51088151 on Ash tree, western end of Roulston Scar, Kilburn, T.L. Blockeel, 10 October 2015.

Ulota crispula: (61*) SE69414448 on *Salix*, R. Derwent, Wheldrake Ings, T.L. Blockeel, 4 October 2014.

Ulota intermedia: (64*) SD98667432 on Ash, Caseker Gill, near Kettlewell, T.L. Blockeel & YNU, 8 October 2016.

Weissia brachycarpa var. ***obliqua***: (64) SE08777381 How Stean, P.N. Gaunt, T.L. Blockeel & M. Adamson, 23 May 2016. A moss of bare soil in relatively stable habitats such as rocky banks and unimproved grassland, much less common than the similar *W. controversa*.

Zygodon viridissimus var. ***stirtonii***: (63) SD92 Colden Clough, Hebden Bridge, J. Turner, 2016. A calcicole moss, known in the Pennine part of VC63 only from outcrops of base-rich gritstone at Hardcastle Crags and this new site in Colden Clough.

Thanks are due to all the contributors of records.

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The hoverfly *Callicera rufa* - The first Yorkshire record (including methodology for artificial rot-holes)

Ken Gartside

Email: ken.gartside@btinternet.com

Overview

The hoverfly *Callicera rufa* is considered a nationally scarce species of Diptera (Syrphidae) and is most frequently found in Scotland in Caledonian Pinewoods of Scots Pine *Pinus sylvestris,* where there are natural wet rot-holes for breeding. There have also been rare English records from, for example, Shropshire, Clumber Park in Notts, Hereford and East Anglia.

The adult is a medium-sized hoverfly with a dark shiny body, thorax with gingery hairs, orange legs and the head has a pair of long, black, white-tipped antennae (Plate 3, centre pages). The larvae approach 30mm in length, have a short, blunt, brown-tipped rear breathing tube and the thorax has two groups of 3 or 4 brownish hooks at the front, like eyebrows (Plate 3, centre pages). These features allow accurate identification from a good photograph. They feed

on filtered micro-organisms from wet decaying matter in the resinous water, so it is crucial to introduce material such as pine needles, offcuts and bark into artificial holes to facilitate growth. Larvae can take 1 to 3 years to pupate and reach maturity and can overwinter.

The Malloch Society in Scotland has written a paper on the creation of artificial rot-holes in pine stumps for the purpose of providing suitable habitat for this hoverfly, with some consequent success (larvae are easier to find than elusive adults). The subject and that paper were raised by Roger Morris on the Facebook Hoverfly Recording Scheme (HRS) site and in October 2016 I made the suggestion to the wardens at RSPB Dovestone to create such holes in a part-felled plantation. Dovestone is an RSPB-managed United Utilities estate and is a richly biodiverse and spectacular high altitude reserve of moorland bog and wooded reservoirs in the Peak District and Yorkshire.

Pennyworth Plantation at Dovestone (SE020040) is in VC63, is over 40 years old and comprises larch, Sitka Spruce *Picea sitchensis*, Lodgepole Pine *Pinus contorta* and Scots Pine. The suggestion was welcomed but, as native Scots Pines were left unfelled, the first holes were mainly in felled stumps of larch and the odd spruce and were cut in November 2016 – a dozen were initially made. Many stumps had been left at a height of 2ft or so to support biodiversity for rotting fungi and insect use, so were a perfect height for this new purpose.

The holes were checked on a regular basis and this resulted in a find of a single *Callicera rufa* larva on 4 August 2017, so most likely from eggs deposited in the spring. This is the first Yorkshire record of this classic Scottish pinewood insect. Further checks located 5 young larvae in 3 different larch rot-holes within two weeks. They continue to be found, with the original hole now containing 4 on 4 September 2017.

Techniques

Two papers worth reading that refer to creation of rot-holes:
From the Malloch society: http://www.mallochsociety.org.uk/callicera-artificial/
https://www.facebook.com/download/preview/507774586239000 (N.B. this link may only work for Facebook members. Ed.)

However, the following methodology worked well at Dovestone and is slightly different from those papers, with enhancements:

1. Stumps were roughly cut with a chain saw into the heartwood at about 45 degrees angle to create an inverted pyramid shaped hole (Plate 3, centre pages).
2. Size c.15cm x 20 cm (6-8''). Smaller size runs the risk of drying out.
3. Holes were allowed to fill or part fill with rainwater – this appears sufficient with a depth of 8-20 cm (3-8'').
4. Small offcuts and shavings were put into the hole, including wood with bark left on – and left partly out of the water.
5. Some holes were left bare, some with just shavings in, as controls.
6. Some were also partly covered after they had filled with rainwater with flat wood offcuts – this may help avoid predation and minimise desiccation.
7. Most stumps were in the open, exposed, some under pines and a couple covered in brash to avoid vandalism, which was unnecessary.
8. The stumps were numbered (although the numbers weathered off).

9. The pyramid cut-outs were removed off-site as they are too easily put back in place.
10. Only reasonable sized stumps that would support the above quoted size were cut, to avoid leakage. Small and old rotting stumps will leak and dry out.

Results

- No lekking on tree trunks has been observed and no adults have been seen to date.
- The holes were checked in spring onwards at monthly intervals and rat-tailed larvae of probably *Myathropa florea* or *Eristalis* ssp. were seen in July.
- On 4 August 17 one *Callicera rufa* larva was found and others subsequently located in two different holes over the next month, making 3 successful holes.
- *Callicera* larvae were always found crawling on introduced barked offcuts when carefully lifted out and are thus easily inspected.
- Many other hoverfly larvae were found in all stump holes but the *Callicera* were only where the introduced wood had bark on.
- We have now recorded 9 *Callicera rufa* individuals – it is likely there are more.

Provisional conclusions

- The bark-on offcuts helped to introduce micro-organisms to the hole, so appear important in the process, certainly for quicker results, rather than just bare cut or decorticated wood which had resultantly fewer larvae in their holes.
- It will be helpful to make the cuts as we have done at an angle rather than a vertical auger drill cut, to facilitate larvae emerging to pupate – it is unlikely that the holes will fill with needles as with natural rot-holes to help this escape process, as the stumps are sometimes well away from shedding trees.
- Offcuts protruding from the water may also be helpful to assist pupation movement.
- It would seem that the hoverfly must have been present at this site already, despite our failure to find it by general searching. 29 hoverfly species have been recorded here so far (by Aug 2017).
- Questions still remain for further research, such as to what extent local rainfall, height above sea level, size of woodland, age and species of tree are important, besides the nature and management of the holes.
- Clearly it is worth looking for this hoverfly at suitable sites with larch and/or Scots Pine.
- Further, it is worth creating rot-holes in such suitable habitat and many national and local authorities, wildlife bodies and landowners will have such sites where this methodology can be tried. It would also be good to have this sort of approach included within conservation advice for Countryside Stewardship woodland applications.
- The methodology is to be discussed by the Dark Peak Woodland BAP group in October 2017. Their many members may support further take-up of this approach following this success story.

Finally, the good news is that this beautiful insect must be far more prevalent than thought.

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Yorkshire Naturalists' Union Conference 2018

The Yorkshire Naturalists' Union Conference will be held on **Saturday 7 April 2018** in the Ron Cooke Hub, University of York, on the theme of:

Non-native species: research, recording and the conservation agenda.

The morning session will discuss the research and recording of non-native species, including horizon scanning and international collaboration, new surveillance techniques and technology, the role of citizen science and the resources available to support identification and recording, from checklists and ID guides to websites and apps. This session will begin with a keynote talk by **Professor Helen Roy** from the Centre for Ecology and Hydrology. Helen's research focuses on the effects of environmental change on insect populations and communities, particularly the dynamics of invasive non-native species and their effects on biodiversity. Helen has led several major citizen science initiatives, coordinated key projects to improve the accessibility of data on non-native species and co-authored the popular *Field Guide to Invasive Plants and Animals in Britain* (Bloomsbury, 2015).

The afternoon session will focus on the management of non-native species and the implications for biodiversity conservation. The keynote address will be delivered by **Professor Chris Thomas**, University of York, who has carried out extensive research on why and how species respond to climate change and to the arrival of non-native species, which can result in biodiversity gains as well as losses. Chris has had a strong influence on conservation policy and practice; with his research group he has developed conservation strategies that will help species to survive in a time of rapid environmental change.

Both sessions will include a range of talks presenting local case studies of research, recording and conservation – there is sure to be something of interest to all YNU members! Throughout the day there will be natural history displays, book sales and plenty of time for networking. It will be a great opportunity for newer members to meet others and find out more about the YNU. The programme will be published on the YNU website in due course.

Conference tickets are £25 for YNU members and £30 for non-members. This includes the conference lunch and refreshments. Further information and booking can be found at www.ynu.org.uk/conference2018

If you would like to bring a poster or display about non-native species, please contact the conference organiser, Paula Lightfoot, on p.lightfoot@btinternet.com or 07539 340128.

Ellen and her frogs

Andy Millard Woodland Villas, 86 Bachelor Lane, Horsforth, Leeds LS18 5NF
Email: editor@ynu.org.uk

Ellen Hazelwood (1913 – 1997), born Ellen Gallwey, had a life-long interest in natural history. Before the 2nd World War she worked as Assistant Curator at the Tolson Memorial Museum, Huddersfield, where she was much influenced by the then director of the museum, the eminent botanist Dr T. W. Woodhead. While working there she met Alfred Hazelwood, whom she married in 1939. Alfred had attended Doncaster Grammar School, held a Studentship for two years at the Bird Room of the British Museum (Natural History) and, in the early 1930s, was Assistant at the Doncaster Museum and Art Gallery. During the war Ellen worked in a munitions factory while her husband was in the Royal Navy and then, after the war, Ellen and Alfred settled in Bolton where Alfred became Director of the Bolton Museum. Following Alfred's death in 1961, Ellen taught Biology, Botany and Zoology full-time to the Sixth Form at the Canon Slade Grammar School. By 1971 she had been elected a Fellow of the Linnaean Society.

By her early 20s Ellen had become involved with the YNU, submitting a number of articles to *The Naturalist* in the early to mid-1930s. These were all on vertebrates with quite an emphasis on reptiles. In 1937 she was made recorder for mammals, reptiles, amphibians and fishes, a role she held until 1961 and which resulted in her main, regular contributions to *The Naturalist* in the form of the annual recorder's reports. In addition to these, between 1950 and 1968 she reviewed for *The Naturalist* a total of 98 books and journals. A list of Ellen's contributions to *The Naturalist*, other than those cited in the text, is given at the end of this article. For her long services to the YNU she was rewarded by being elected President for 1962, only the second woman after Lorna Scott to fill the role since the YNU's formation.

A few years after this she wrote the chapter on mammals for *The Naturalists' Yorkshire* (Sledge, 1971), including within this brief sections on reptiles and amphibians. The chapter dealt with the main mammal orders and included information on how to distinguish between closely related species, for example, Common, Lesser (usually known as Pygmy) and Water Shrews (*Sorex araneus*, *Sorex minutus* and *Neomys fodiens* respectively), together with aspects of their behaviour. In some cases, guidance was given on how to find, observe and, where appropriate, detect presence through means other than direct observation. Ellen sometimes interspersed this advice with humorous asides, for example, having commented on the "great antiquity" of some Badger setts, she then offered the following guidance: "The Badger's power of scent is of the highest order so, should you decide to join their nightly frolics, be sure to place yourself against the wind and well in advance of their emergence. And do not stumble into their latrines – also of great antiquity! – on your way home in the early hours". Information on the distribution of mammals, reptiles and amphibians in Yorkshire was very general with occasional specific locations given. This probably reflects the fact that the data then available to Ellen predated that published in Corbet (1971) (in the same year as *The Naturalists' Yorkshire*) and in Howes (1983), both of which undertook extensive research of available records to produce species' distribution maps. There were some anomalies in Ellen's information on records, for example, she stated that the Lesser Horseshoe Bat *Rhinolophus hipposideros* had been reported from Emley when the only records for the 20th century noted in Delany (1985) were from

the Helmsley area. Also, she made no mention of Roe Deer *Capreolus capreolus* when there was already evidence of it in Forestry Commission woodland west of Scarborough and the Hambleton Hills (Willett, 1970). Unlike most other chapters in the book, Ellen did not include scientific names as a matter of course and wrote in quite an anecdotal style, with her concern for the human impact on species being made very explicit at times, for example, in a sentence on the Great Crested Newt, she stated that "...many are caught for sale, which is deplorable".

One of her last contributions to *The Naturalist*, apart from four further book reviews, was a call for information on tadpoles in 1968 (Hazelwood, 1968c). This signalled her ongoing main interest, which was in amphibians. This included long-term studies of the Common Frog *Rana temporaria* population in a field pond near Bradshaw, Bolton from 1965 to 1977 and in a garden pond in the same area from 1957 to 1992. These observations formed the nucleus of a 34 page booklet (Hazelwood, 1992), privately published by Ellen and printed by Blackshaw Sykes & Morris Ltd of Bolton. A notice of the publication was given in the YNU *Bulletin* (Anon., 1993). As well as records of frog numbers in the two ponds over this period, the booklet contains small sections on a variety of other aspects of frog biology and ecology, including partial neotony, excretion of poison, the effects of droughts and ice on spawn, occasions when it had literally rained froglets and 'Operation Froglift' in 1971 and 1991.

In 1993 Ellen contributed a short note to the YNU *Bulletin* (Hazelwood, 1993a) on disappearing frog spawn. During the same year she published a second booklet, *Consider the Frogs* (41pp) (Hazelwood, 1993b), in a format similar to the first. Whereas *Count the Frogs* could be considered a collection of records and incidental observations, this second booklet had more of a central theme running through it, essentially the frog year from 'The Spring Awakening' through spawning, tadpole development and metamorphosis to 'The Autumn Assembly'. Both volumes are illustrated with colour images and some delightful, closely observed line drawings.

As the title of her first booklet implies, Ellen seems to have been motivated to produce them by particular concern over declining numbers, which she graphically illustrated with data from both the field and garden ponds she studied, and threats to the natural world in general. It would be fair to say that she was quite dubious about the value of professional qualifications in ecology and related subjects and saw herself very much as a traditional 'naturalist'. She showed little enthusiasm for the reductionist direction of much biological study and keenly promulgated the vital need for organisms to be studied in their natural environment, as is illustrated by a passage from her YNU presidential address: "it is essential that the distant view should be available as well as the close-up for no single organism can be taken out of its environment and away from the other forms of life which live with and influence it if the living organism is to be understood" (Hazelwood, 1963). In the closing passages of her address she makes a plea for "children to really study the living subjects in their natural homes" rather than being "merely supplied with an isolated living specimen on a watch-glass on a laboratory bench". Living in towns is no excuse: "should it not be possible to study those animals and plants which share town life?". It is quite poignant that over 50 years later the need to get children outdoors and experiencing the natural world is recognised as more important than ever.

Ellen's scepticism of qualifications and, according to her daughter, what she saw as the increasing insistence on these, "filled her with scorn and rage" (M. Whyte, pers. comm.)! There is a sense in which these attitudes are reflected in her two booklets, the first, in particular, having less

of an underlying structure to it than might have been desirable. Nonetheless, both volumes contain a mass of fascinating field observations, recorded in great detail and accompanied by informative and attractive illustrations. Quite often these observations are helpfully supplemented by the relevant theoretical underpinning, ironically, often a consequence of the kind of lab-based studies that Ellen was less than enthusiastic for. Ellen was clearly a first-rate naturalist who demonstrated great field skills and made some very significant contributions to the YNU during her lifetime.

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Note: I have a small number of both of Ellen's booklets on frogs so if anyone is interested in obtaining a copy or copies please contact me.

Book review

Britain's Spiders. A field guide. Bee, L., Oxford, G. & Smith, H. (2017) Princeton University Press, Woodstock. Designed by WILDGuides Ltd, Hampshire, produced in association with the British Arachnological Society. Flexibound, 480pp £24.95. ISBN 9780691165295

Spiders. A group of invertebrates that elicit fear and fascination in almost equal measure; yet there has been no recent publication aimed at the field naturalist since Dick Jones' *Country Life Guide to Spiders of Britain and Northern Europe*, published in the late 1980s and long-since out of print. In the intervening three decades, advances in macro-photography have opened up the possibilities of high quality images of a range of invertebrate taxa and this publication follows on from the successful and acclaimed *Britain's Hoverflies*, which is now in a second edition.

Britain's Spiders therefore aims to provide the user with the means to identify spiders in the field using characters observable with a hand lens or the naked eye rather than solely relying on the use of a stereo microscope and individual species' genitalia. With more than 700 photographs, just under 400 of the c.670 species of spider recorded in the UK are covered in the main section of the field guide. Only the money-spiders (Linyphiidae) are, with a handful of exceptions, excluded, owing to their small size and reliance on microscopic features to reach an accurate determination, even to genus. However, this should not put you off as the book does not claim to be comprehensive and many, including the reviewer, delay getting to grips with the money-spiders until they are confident with the other 36 families.

However, the book offers more than just a means of naming a specimen. The first fifty pages introduces the reader to the group and helps the novice separate spiders from the other British members of the Class Arachnida (harvestmen, mites, ticks and pseudoscorpions). A glossary of useful terms, illustrated in part to help the beginner recognise what is meant by, for example, the cardiac mark or the fovea, is provided to aid clarity. A substantial section on spider biology and anatomy covers subjects such as webs, egg-sacs, development and parasites. This provides an interesting background to the group which will enable the user to appreciate spiders beyond assigning a name. Further chapters on how to collect and find spiders, including commentary on equipment, will aid the beginner who may be delving into the fascinating world of invertebrates for the first time. This includes ideas on how to make your own sweep-net, pooter, spider viewing-pot (spi-pot) and the potential benefits of an electric toothbrush (seriously!) when fishing for specimens.

The next section is devoted to the publication's primary objective – naming the specimen. Usefully, it starts with an overview of the 37 families recorded in Britain, which includes the single member of the dwarf cobweb spiders (Mysmenidae), first recorded in Britain in 2012. Each family is assigned a vernacular name; thus the Agelenidae are referred to as funnelweb spiders, the Lycosidae (wolf spiders) and Salticidae (jumping spiders). These names are useful in a UK context, for example when communicating to audiences at Bioblitzes or similar events; but are not universally applicable. For example, Australians will recognise the term funnelweb spiders but with possibly different reactions, because the Sydney Funnelweb *Atrax robustus* belongs to a different family (Hexathelidae) and suborder.

Following the introduction to families, and perhaps uniquely, this richly illustrated book provides a guide to the different webs and egg-sacs that are constructed by different species, genera or groups. The layperson will be familiar with the orb-web but the other intricate designs, particularly the various egg-sacs, will potentially expose the reader to an element of awe and wonder. How many naturalists will have wondered (or even come across) what created the miniature inverted wine-glasses observed attached to plant stems? This section of the book will provide answers to this and other related queries to the silk constructions created by our spider fauna.

The next 320 pages or so are devoted to the identification of Britain's spider fauna. Apart from 11 species, the money-spiders are deliberately omitted from the book owing to their small size and strict necessity to refer to microscopic features, including the genitalia and positions of specialist hairs on legs. Thus the book will help guide the user to place a name against 395 species of the remaining 36 families currently recorded in Britain. The vast majority of the species are illustrated and where there is sexual dimorphism (differences in males and females) examples of both are frequently provided. Further, more detailed photographs are provided to point out critical features such as the different shading on *Episinus* species' third leg (see page 121). Each entry follows a broadly standard format under four sub-headings: observation tips/habitat; description; similar species; and distribution/status. A colour map provides an indication of distribution based on the national spider recording scheme (http://srs.britishspiders.org.uk) and the current nature conservation status is conveyed above this (where applicable), e.g. Nationally Scarce, with a brief description of the British distribution (e.g. uncommon, regional). A phenology chart is provided, giving an indication when the spiders are adult (sexually mature) and thus identifiable to species level.

A detailed explanation of all the codes, icons and terms is provided on pages 96 and 97 but usefully summarised on the front cover internal flap (incidentally, the internal flaps (the rear cover provides a quick family index) can usefully act as a book mark). The reader will note three identification icons: an eye, magnifying glass and microscope. It is the way with spiders that relatively few species can be reliably identified with certainty in the field simply by looking at it and comparing it with a picture. Thus, species entries appended with the magnifying glass icon will require careful, close examination – hence the usefulness of creating a spi-pot. Emphasis is given that for the user to increase their certainty, and thus the reliability of a conclusion, reference to habitat, time of year and the written description should be undertaken in combination with the photograph. However, colour variation (depth and pattern strength) means that reliance on photographs alone cannot be advised; and it may not be possible to reliably identify a specimen beyond genus in many situations. Inevitably, some users may be disappointed that a definitive conclusion cannot be made but one of the expressed hopes of the authors is to encourage some to become sufficiently fascinated such that perhaps they move from accepting the 'balance of probability' conclusion and reach the 'beyond reasonable doubt' threshold, through progressing to the use of a good quality stereo microscope. Even so, in the summer 2017 British Arachnological Society Newsletter, a request has been made for a better understanding of characters and features that could further improve our understanding of spider identification in the field such that a second edition of this book can be produced.

The final pages of the book are devoted to working in the field (e.g. H&S), spider recording and relevant legislation; plus a summary on the updated nature conservation status of British

spiders, including the introduction of an amber 'watch' list of spiders that are currently widespread but are declining. Lastly, a complete checklist of all British species, including the money-spiders, with updated nature conservation status is given.

As someone who has been actively surveying and studying spiders since the early 1990s, this book has offered new insights and information and has been much used during the 2017 survey season (having been published in May 2017). The photographs, taken by a wide range of individuals, convey spiders in a way that no other identification guide to the group has achieved. The skill and dedication to achieve this should not be under-estimated and the various contributors are cited (by spider species) between pages 466 and 471. Such a lengthy acknowledgment section is an indication of the number of contributors to this publication – a real team effort. Nevertheless, the authors should be commended for bringing the publication together and to fruition.

It is really difficult to make any criticism of this well designed, richly illustrated and detailed publication. For a field guide, it is quite heavy (exactly 1kg) and it will not easily fit into a jacket pocket but as a small collecting bag will be needed anyway to carry pooter(s) and other collecting equipment, this is not a hindrance. It is described as flexi-bound, which is more robust than a softback but not as solid as a hardback. The book's binding is such that it can be opened flat; a useful attribute when putting it down to compare the description and photo with the specimen in front of you.

Finally, it should be stressed that there are no keys so the reader is reliant on reading the description and comparing their specimen's general appearance and form with the pictorial list of families (pages 4 and 5) and more detailed descriptions (between pages 54 and 73). With practice and perseverance, placing a spider in its correct family should become relatively straightforward.

This is, without doubt, a fantastic publication. Spiders are a difficult group to identify and reliance on features observable under a microscope for definitive identification is justified. Nevertheless, the authors, photographers and publisher are to be congratulated on producing a high quality guide to the UK's spider fauna which will be as useful to the experienced arachnologist as it is for the beginner. For a price tag of less than £25, given the quality and huge amount of information contained within, it is very good value for money and is highly recommended.

Richard Wilson
YNU Spider Recorder and Area Organiser for Yorkshire, Co. Durham and Northumberland for the Spider Recording Scheme

Yorkshire Naturalists' Union Excursions in 2017

Beecroft Plantation & Thackray Beck (VC64) 20 May 2017

INTRODUCTION (Terry Whitaker)
Twenty members attended, representing 13 affiliated societies. The Yorkshire Moth Group put out 8 traps (five generator powered M/V Robinson pattern traps and three battery Actinic Heath traps) in five of the six 1km grid squares of the Beecroft Moor Plantation. The weather looked very good for early year moth trapping but the cloud cleared and temperatures fell dramatically by dawn, reducing catch potential. After a chill start on Saturday morning the bright sun made surveying a pleasure but by midday it was raining heavily and many people decided to leave early, before the reporting meeting which was held in the Robinson Library & Village Hall, Timble.

We thank Geoff Lomas, Catchment & Recreation Manager Yorkshire Water for permission to visit the site.

FLOWERING PLANTS (Wendy English and Sarah & Ken White)
Plant lists for four 1km squares of Beecroft Plantation: SE1753 (109 spp.), SE1754 (6 spp.), 1853 (69 spp.), & SE1854 (35 spp.) were compiled. No particularly interesting plants were noted.

Regrettably a few non-native shrubs and plants such as *Spirea* spp., *Cornus alba* and *Crocosmia* sp. appear to be associated with recent ride tree plantings and they are forming dense stands, reducing the grassland areas. The hybrid larch *Larix* x *marschlinsii*, which often originates when the parents are grown together, was also noted in SE1753. It is fertile and can back-cross with either parent, and regeneration from seed is frequent. It was not recorded from the wild, however, until 1983.

The invasive New Zealand Pigmyweed *Crassula helmsii* was infesting the shoreline of Fewston Reservoir at SE182543. This is one of five introduced aquatic plants which were banned from sale from 2014, but too late, as it is rapidly spreading in the UK and is threatening a number of rare taxa.

PLANT GALLS (Tom Higginbottom)
On the oaks of Beecroft Plantation there were a number of old galls caused by gall wasps which had formed on oak buds during the previous summer. These included Marble Gall *Andricus kollari*, Cola-nut Gall *A. lignicolus* and Artichoke Gall *A. foecundatrix*. It was good to see examples of the new season's galls, with the first generation of the Currant Gall *Neuroterus quercusbaccarum* being reasonably common on both the catkins and the young oak leaves. On the catkins of a single oak there were a small number of galls with a grooved and ridged surface which indicated *A. quadrilineatus*. Distinctive swellings and leaf distortions indicated the presence of *A. curvator*. There were also occasional examples of the Oak Apple Gall *Biorhiza pallida*. Records from Yorkshire and other parts of the country give the impression that the Oak Apple is more common this year than it has been for some time. The bright orange fungus *Puccinia urticae* was visible, distorting the leaves of Stinging Nettles *Urtica dioica*, and leaves of Bluebell *Endymion non-scriptum* were affected by the fungus *Uromyces muscari*. Leaves of

Alders *Alnus glutinosa* growing by Fewston Reservoir were hosts to the common mites: *Acalitus brevitarsus, Aceria laevis* and *A. nalepai*. The pimples caused by the mite *Phyllocoptes eupadi* were present on many leaves of Bird Cherry *Prunus padus* growing nearby. No midge galls were recorded at either of the sites visited.

LEPIDOPTERA (Charles Fletcher and Terry Whitaker)
On the Friday evening several MV and actinic traps were set up in wooded areas across the site. May can be an unpredictable time for moth trapping as spring moths have finished flying and summer ones take some time to build up numbers. A total of 45 species, however, was a good return and several interesting moths were found. Nut-tree Tussock *Colocasia coryli* was the most unexpected as it has never been recorded in the Washburn Valley area. Other interesting moths included Welsh Wave *Venusia cambrica*, Ochreous Pug *Eupithecia indigata*, Broken-barred Carpet *Electrophaes corylata* and Glaucous Shears *Papestra biren*.

A further 12 species were located in the daytime before afternoon rain called a halt to proceedings. The tiny but attractive *Micropterix aureatella* and *M. tunbergella* were both flying by day along with a single *Elachista apicipunctella*. Larval mines of three *Eriocrania* species (*E. salopiella*, *E. sangii* and *E. semipurpurella*) were common on birch, and a larva of Pale Brindled Beauty *Phigalia pilosaria* was swept from birch. When the final totals were added up, ten species were found to be new for the 10km square SE15.

Butterflies were widespread after the chill of dawn gave way to warm bright sun. The most abundant were the Red Admiral and the more typical woodland glade butterflies - the Speckled Wood, the Orange-tip and the Green-veined White. Small Tortoiseshell and Peacock butterflies were also widely seen.

COLEOPTERA (Charles Fletcher and Bob Marsh)
Beech Leaf Miner *Orchestes fagi* mines were common on Beech *Fagus sylvatica* and several beetles came to light, notably the Common Cockchafer *Melolontha melolontha*. Cream-spot Ladybirds *Calvia quattuordecimguttata* and 14-spot Ladybird *Propylea quattuordecimpunctata* were swept by day, as were the Longhorn Beetles *Rhagium bifasciatum* (whose larvae are typically associated with pine wood) and *Rhagium mordax* (typically associated with Beech wood).

Altogether 24 beetles were identified in Richard Wilson's vacuum sample. Many were typical of such habitat. Wetland beetles were represented by the carabids *Trichocellus placidus* and *Agonum fuliginosum*; the only water beetle in the sample was *Helophorus aequalis*, a very common beetle associated with many wet habitat types. A carabid always interesting to find was the Snail Hunter *Cychrus caraboides*, a predator evolved to feed on molluscs. Several species of rove beetle *Stenus* were found, including *S. flavipes, S. juno* and *S. providus*. Other damp habitat beetles included the very common *Anacaena globulus* and the click-beetle *Hypnoidus riparius*.

OTHER ORDERS: ARTHROPODS (Richard Wilson and Charles Fletcher)
The small lace hopper *Cixius nervosus* and the red and black froghopper *Cercopsis vulnerata* were seen and the Water Cricket *Velia caprai* was reported from Thackray Beck. Two species of woodlice (*Trichoniscus pusillus*, *Oniscus asellus*) and a Pill Millipede *Glomeris marginata* were

found by vacuum sampling. The large black and white woodland hoverfly *Volucella pellucens* was observed in SD1753.

SPIDERS (Richard Wilson)
Plantation woodland is not generally considered to be of particular interest to naturalists, owing to its dense canopy, resulting in a limited ground flora and generally homogenous structure. However, experience surveying in similar habitat in Northumberland and elsewhere in Yorkshire has taught me that where there are pockets of semi-natural habitat, an interesting fauna potentially exists.

A check on the national spider recording scheme (SRS) database for Yorkshire identified that the tetrads associated with Beecroft Moor Plantation SE15R (6spp.), SE15S (22spp.), SE15X (2spp.) and SE15W (45spp.) are relatively poorly recorded and no records attributable to this woodland are apparent.

Taking advice from Terry Whitaker, the clearings associated with the meandering Thackray Beck seemed to be the most promising. It was decided to focus on vacuum sampling the ground layer using a modified garden blow-vac. This has consistently proven to be an effective means of collecting a large number of individuals and species in a relatively short period of time. The first sample collected was from the moss, grasses and leaf-litter on the edge of the plantation, just north of the public footpath (SE17225393; SE15R) and yielded 12 species. As expected, a large number of small money-spiders (Linyphiidae) were collected, of which five (*Meioneta saxatilis*, *Diplocephalus picinus*, *Tenuiphantes tenebricola*, *T. flavipes*, and *Erigonella hiemalis*) were new for the hectad. All are relatively widespread and typically associated with woodland leaf-litter; but *T. tenebricola* is generally considered to be more common in the north of the UK. However, the most pleasing was the small and often overlooked jumping-spider (Salticidae) *Neon reticulatus*. This is typically light-brown in colour with dark streaking, and therefore hard to spot amongst the leaf-litter. Knowing that the weather was likely to deteriorate rapidly around lunchtime, after two samples I moved slightly north and downslope to a small clearing immediately adjacent to the channel of the Thackray Beck (SE17255400; SE15S); which yielded 17 species. The vegetation here is structurally complex with tussocks of Great Woodrush *Luzula sylvatica*, bramble *Rubus fruticosus* agg. and grasses; always a promising sign when surveying for invertebrates and especially spiders. Two vacuum samples were taken, yielding a typical spider fauna associated with wetter vegetation communities in or close to woodlands. Two wolf-spiders (Lycosidae), *Pardosa amentata* and *Pirata hygrophilus,* were found here. The latter is infrequently collected and, apart from Moor Piece N.R. north-west of Clitheroe and Askham Bog near York, it has rarely been recorded in VC64.

Other typical spiders of the areas surveyed included *Clubiona lutescens* (Clubionidae), *Bathyphantes nigrinus* and *Baryphyma trifrons* (both Linyphiidae). This latter money-spider is a denizen of wet environments and is scarce south of a line between the Humber and the Wirral. A further four spiders (*Clubiona reclusa*, *Neottiura bimaculata* (Theridiidae), *Oedothorax gibbosus* and *Palliduphante pallidus* (both Linyphiidae) were new to the hectad.

A combined total of 28 species was recorded across both sites using the G-Vac from approximately 12 minutes of sampling (excluding sieving and collecting). Unfortunately, the weather, true to forecast, rapidly deteriorated and with the rain settling in, it was decided to call it a day. This

was a shame as it would have been interesting to undertake additional methods which would certainly have recorded additional spiders for the site and tetrads. All records have been added to the national SRS database.

Spider Species recorded by Richard Wilson 20 May 2017

Family	Taxon	Authority	Individuals
Theridiidae	*Neottiura bimaculata*	(Linnaeus, 1767)	1
Linyphiidae	*Walckenaeria acuminata*	Blackwall, 1833	1
	Dicymbium tibiale	(Blackwall, 1836)	5
	Gongylidium rufipes	(Linnaeus, 1758)	2
	Dismodicus bifrons	(Blackwall, 1841)	1
	Baryphyma trifrons	(O.P.-Cambridge, 1863)	2
	Pocadicnemis pumila	(Blackwall, 1841)	16
	Oedothorax gibbosus	(Blackwall, 1841)	16
	Oedothorax gibbosus f. tuberosus	(Blackwall, 1841)	1
	Cnephalocotes obscurus	(Blackwall, 1834)	2
	Micrargus herbigradus	(Blackwall, 1854)	4
	Erigonella hiemalis	(Blackwall, 1841)	1
	Diplocephalus picinus	(Blackwall, 1841)	1
	Meioneta saxatilis	(Blackwall, 1844)	1
	Bathyphantes nigrinus	(Westring, 1851)	3
	Tenuiphantes alacris	(Blackwall, 1853)	1
	Tenuiphantes zimmermanni	(Bertkau, 1890)	9
	Tenuiphantes cristatus	(Menge, 1866)	2
	Tenuiphantes flavipes	(Blackwall, 1854)	2
	Tenuiphantes tenebricola	(Wider, 1834)	1
	Palliduphantes pallidus	(O.P.-Cambridge, 1871)	2
	Linyphia triangularis	(Clerck, 1757)	1
	Linyphia hortensis	Sundevall, 1830	1
Tetragnathidae	*Pachygnatha clercki*	Sundevall, 1823	1
Lycosidae	*Pardosa amentata*	(Clerck, 1757)	5
	Pirata hygrophilus	Thorell, 1872	11
Clubionidae	*Clubiona reclusa*	O.P.-Cambridge, 1863	1
	Clubiona lutescens	Westring, 1851	1
Salticidae	*Neon reticulatus*	(Blackwall, 1853)	3

MOLLUSCS (Adrian Norris and Terry Crawford)

We walked from the car park down to Fewston Reservoir, along the banks of the reservoir to Beecroft Plantation, through the woodlands to emerge on the road near Ridge Farm, and back along the road to complete the circuit. The area is too acidic for a rich molluscan fauna and we found only 11 different species; of these, ten and six were found in the two 1km squares with records. There was nothing of note except that the Kentish Snail *Monacha cantiana* was found at two places c.300m apart on the roadside verge near White Crag Farm. This snail has a south-easterly distribution in England and at this latitude is rarely found to the west of the Magnesian Limestone strip, although AN and David Lindley did find it c.3km away at Blubberhouses village in January 2005.

FRESHWATER BIOLOGY (Sharon and Peter Flint)
The weather made collecting very hard work and the Freshwater Section found nothing noteworthy in the freshwater invertebrates of Thackray Beck. In the evening, however, after the reporting meeting, the weather brightened up again and we spent time on the shore of Fewston Reservoir where we found the larvae of the large Scarce Summer Mayfly *Siphlonurus armatus,* which the national recorder was very pleased to hear about as, although widely distributed, it is not often recorded.

BIRDS (Charles Fletcher)
34 species of birds were recorded throughout the day and the moth trappers were rewarded for their early start by an impressive dawn chorus in the sunshine. It was nice to hear a Cuckoo singing along with two Redstarts, six Garden Warblers and good numbers of Blackcaps, Common Whitethroats, Willow Warblers and Chiffchaffs. Robin, Great Tit, Blue Tit, Jackdaw and Great-spotted Woodpecker were all seen carrying food.

MAMMALS (Terry Whitaker)
Few vertebrates were reported but Roe Deer were present in both SE1754 and SE1753 of Beecroft Plantation.

Aysgarth Freeholders' & St. John's Wood/Riddings Field (VC65) 10 June 2017

INTRODUCTION (Terry Whitaker)
Despite a dire weather forecast the Yorkshire moth group had a favourable Friday night in a partial weather window. Eight generator-driven Robinson moth traps and one actinic Heath trap were deployed with nine people trapping or helping to empty the traps which were in two different 1km squares. Samples of riverflies and Hymenoptera:Parasitica in the traps were directed to the county recorders. However rain set in during the early hours and continued as a steady downpour all day. This cold wet and windy start undoubtedly put off other members and only four additional people turned up for the daytime activities which mainly involved a circular walk through Freeholders Wood alongside a raging River Ure. St John's Wood was also visited, passing through the edges of Riddings Field followed by a return to the car park via the footpath near the disused railway line. By lunchtime the remaining six participants decided to call it a day and retreat to dry out and not to hold a formal reporting meeting. Very favourable comments were made on the site management. Members from four affilliated societies were present on the day.

Sarah and Ken White revisited the location later in the week and in better weather added to their plant and bird reports and the Yorkshire conchologists visited the site during August.

We thank Ian Court of the Yorkshire Dales National Park Authority for permission to visit the site.

BOTANY (Sarah and Ken White)
As the day of the Excursion was so wet, we visited again the following Thursday to complete our recording. The site comprises old coppice woodland (an unusual habitat in Wensleydale)

and limestone grassland, both lying adjacent to the River Ure. As a result of this mosaic of habitats, the site is rich in plant species and a list of over 150 was recorded. Recording was done by monad and the results will contribute to the BSBI 2020 Atlas project. Highlights included a stand of Herb Paris *Paris quadrifolia* some four metres square in a recent coppice block and several very unusual plants of Wood Sedge *Carex sylvatica* with branched female spikes (see Plate 6, centre pages). Specimens were sent to Mike Porter, the BSBI sedge referee, who commented that he and Michael Foley had seen similar ones (found by Gordon Young) some years ago alongside the River Tees. He has asked that we inspect the plants again next year to determine whether the character is perpetuated.

In the woodland we noted both Wood Avens *Geum urbanum* and Water Avens *G. rivale* together with their hybrid *G. x intermedium*. The limestone grassland of Riddings Field was colourful with flowering Rock Rose *Helianthemum nummularium* and there were leaves of Betony *Betonica officinalis* as well as masses of the extended leaves of Hairy Violet *Viola hirta*. On the riverside rocks were Blue Moor-grass *Sesleria caerulea,* Long-stalked Yellow-sedge *Carex viridula* ssp. *brachyrrhyncha* and Knotted Pearlwort *Sagina nodosa*. Brittle Bladder-fern *Cystopteris fragilis* and Fairy Foxglove *Erinus alpinus* were found on the old railway bridge.

PLANT GALLS (Tom Higginbottom)

My first visit to Freeholders' Wood took place in 1985 when Fred Stubbs was the VC65 Secretary. 1985 was also the year when Fred was instrumental in forming the British Plant Gall Society. On the edge of the car park the mite *Eriophyes similis* had caused numerous pimples on the edge of the leaves of Blackthorn *Prunus spinosus*. The psyllid *Phyllopsis* had caused leaf rolls on the leaves of Ash *Fraxinus excelsior*, and there were also swellings on the central veins which indicated the presence of the midge galler *Dasineura fraxini*. A mite *Phytoptus avellanae* had enlarged buds of Hazel *Corylus avellana*. In Freeholders' Wood leaf rolls on Beech were caused by the mite *Acalitus plicans*. An erineum on the underside of the leaves and white discolouration of the veins on the upper surface were a result of the same mite galler, *Aceria nervisequa*. There were many pimples on leaves of Bird Cherry, a common tree in the wood, caused by the mite *Phyllocoptes eupadi*. In the wood to the north of the disused railway line, on buds of Sessile Oak *Quercus petraea*, the wasp *Andricus foecundatrix* had caused examples of the Artichoke Gall. On sallow leaves there were numerous pimples with circular red-rimmed openings below caused by the midge *Iteomyia capreae*. Larger oval swellings were examples of the sawfly *Pontania bridgmanii*. A leaf edge of Creeping Buttercup *Ranunculus repens* had been enlarged and thickened by the midge *Dasineura ranunculi*. Another midge, *D. urticae*, had caused irregular thickened pouch-like swellings on Stinging Nettle. The stems of some plants had been distorted by the fungus *Puccinia urticata*.

MOLLUSCS (Adrian Norris and Terry Crawford)

None of the members of the Yorkshire Conchological Society was able to attend the VC65 Excursion. This was unfortunate because we had hoped to check some historical sites for minute and rare *Vertigo* spp. (whorl snails). Accordingly, Tony and Moira Wardhaugh, Tony Serjeant (the Senior Wildlife Officer for the Yorkshire Dales National Park) and ourselves visited the area on 6 August. Our first objective was to check on two locations for the Mountain Whorl Snail *Vertigo alpestris*. This was located at SE01318912 on the dry-stone wall that bounds the northern edge of Freeholders' Wood. Lindley (2016) had found it in 2006 about 30m distant along the wall in an area that is now overgrown with vegetation and inaccessible. The other

site, at SE015888 on the eastern boundary wall near the footpath, which had been found by AN on 15 June 1985, was not re-found; the wall is now severely broken down and overgrown. The Wall (or Wry-necked) Whorl Snail *Vertigo pusilla* was first recorded by Ralph Lowe in 1972 in a lane at Low Bolton, Redmire, SE040909. Lindley (2016) notes that he visited the site in 2003 and 2006 when it was common. We also found it to be common in the old walls on both sides of the lane from SE04089090 to SE03969085. Two of the sites therefore reconfirm those published by David Lindley in his 2016 paper on the Whorl Snails (see *The Naturalist* 141: 27-38). The location of these whorl snails within this area of the Dales is of significant interest. We were also able to add a few molluscs to both of the site lists. In Freeholders' Wood we added both the Worm Slug *Boettgerilla pallens* and the Glossy (or Swiss) Glass Snail *Oxychilus navarricus helveticus* whilst at Low Bolton we added the Least Slippery Moss Snail *Cochlicella lubricella* and the Strawberry Snail *Trochulus striolatus*.

LEPIDOPTERA (Charles Fletcher and Terry Whitaker)
Overnight rain and poor conditions in the morning meant that the moth traps had to be sorted under cover by the visitor centre. A final total of 95 species was a good return for the effort as 32 of these were new for the site, taking the total to 278. 25 were new for 10km square SE08.

Amongst the microlepidoptera, the most notable were *Incurvaria praelatella* and *Elachista subocellea,* which were the first for VC65 since Porritt's time. Other unusual micros included *Denisia similella* and *Elachista adscitella* in the moth traps and *Ectoedemia intimella* flying by day. Some nice moths of upland woodland habitats included Lunar Thorn *Selenia lunularia* and Coronet *Craniophora ligustri* and the catch of 53 Common Lutestring *Ochropacha duplaris* was probably the highest number taken in a single night in the county. Other highlights included Small Elephant Hawk-moth *Deilephila porcellus*, Broken-barred Carpet *Electrophaes corylata* and Dark Spectacle *Abrostola tripartita*. Several Chimney Sweeper moths *Odezia atrata* were encountered flying strongly in light rain over calcareous grassland near the river.

The continual rain precluded seeing many butterflies but during a brighter period occasional bedraggled Green-veined White and Meadow Brown were seen in parts of Riddings Field.

FRESHWATER BIOLOGY (Sharon and Peter Flint)
Although the day of the Excursion was inclement and the Freshwater Section found very little, the moth trappers had a reasonably good night and there were many riverflies in the traps. There were only eight caddis flies, including one micro-caddis, *Hydroptila forcipata*. There was also a single mayfly, the Blue Winged Olive *Seratella ignita* in the traps. A single specimen of a second mayfly, the Yellow May Dun *Heptagenia sulphurea* was disturbed from trees overhanging the Lower Force. This is a medium sized mayfly and lived up to its name by being obviously bright yellow in flight, even on such a dull wet day.

BIRDS (Sarah and Ken White)
The woodland was ringing with birdsong including Blackcap, Willow Warbler, Song Thrush, Blackbird, Garden Warbler, Goldcrest and Chiffchaff. In total 25 birds were recorded, with 8 of these demonstrating confirmed breeding. Highlights were the House Martins and Swifts nesting on the YDNP Information Centre, Grey Wagtails carrying food, fledgling Nuthatch and fledgling Long-tailed Tits.

MAMMALS (Terry Whitaker)
Few vertebrates were reported but Moles were active (forming hills) throughout both 1km squares and the barking of Roe Deer accompanied the moth trappers' crepuscular activities in the woodland. In addition the Dormice introduced to the site are still doing well.

Eastrington Ponds (VC61) 8 July 2017

INTRODUCTION (Sarah White)
The Excursion was held at Eastrington Ponds Local Nature Reserve at the kind invitation of East Riding Council. We were fortunate in having a dry, sunny day and 17 members attended the meeting. We explored the interesting range of habitats the reserve offers, including ponds, wooded railway embankment, dry grassland, marsh and fen. The meeting was held at Eastrington Village Hall with 11 affiliated societies represented.

Members present wished to congratulate East Riding Council on its management of the site, in particular the well-maintained paths and encouragement of responsible use by dog walkers. The picnic area by the car park had attractive stands of flowering plants, attracting many insects, which could be viewed from the picnic benches. Comments were made that several of the smaller ponds contained too much leaf litter and it is recommended that overhanging and shading trees should be cut back, or even dug out, to let in more light. More small cleared areas and glades would encourage butterflies and the woodland would benefit from leaving large dead logs *in situ*.

As there is no specific report for mammals, reptiles or amphibians, these are included here. A dead Hare was seen (half a mile away from the reserve) as well as Mole hills, a Grey Squirrel and a Rabbit. Young Toads were seen and a Grass Snake was found in the meadow.

FLOWERING PLANTS (Richard Middleton)
The pond area and adjoining disused railway were found to be extensively planted with a wide variety of shrubs and trees, both native and "exotic". This included a variety of willows and poplars, Guelder-rose *Viburnum opulus*, Common Whitebeam *Sorbus aria*, Grey Alder *Alnus incana* and many others. There was a definite impression that, in some places, the dense tree canopy was shading the site to the detriment of the other plants and water quality.

The aquatic flora was somewhat disappointing and Spiked Water-milfoil *Myriophyllum spicatum* (see Plate 8, centre pages) seemed to dominate the large pond to the exclusion of most other plants; the pond to the west of the large meadow was largely covered with a mat of Least Duckweed *Lemna minuta*. The marginals again were not particularly varied but included Sweet-flag *Acorus calamus*, Bulrush *Typha latifolia* and Lesser Bulrush *Typha angustifolia* – although these had probably been introduced. Adjoining ditches seemed to contain some relics of the original wetland vegetation with Bittersweet *Solanum dulcamara*, Remote Sedge *Carex remota*, False Fox-sedge *Carex otrubae*, Gypsywort *Lycopus europaeus*, Water Figwort *Scrophularia auriculata* and Meadowsweet *Filipendula ulmaria* being found. Pepper-saxifrage *Silaum silaus*, previously known from the site, was re-located.

The most spectacular botanical feature of the site was undoubtedly the large, colourful sown

'meadow' with Bird's-foot-trefoil *Lotus corniculatus* var. *sativus*, various clovers including Alsike Clover *Trifolium hybridum*, Smooth Tare *Vicia tetrasperma*, Hedge Bedstraw *Galium album*, Lady's Bedstraw *Galium verum*, Betony *Stachys officinalis* and Yellow-rattle *Rhinanthus minor*. It provoked much discussion among the botanists concerning the advisability of sowing large amounts of 'almost native' plants and the effects they may have on the local gene pool, a prime concern being the knapweeds, most of which were slender pseudo-radiate forms unlike the Common Knapweed *Centaurea nigra* native to the area. We were, however, unanimously pleased to find Common Centaury *Centaurium erythraea* and Square-stalked St John's-wort *Hypericum tetrapterum* growing along the field's northern margin – probably native. The smaller meadow, although well grazed, retained a damp and rushy character with Tufted Hair-grass *Deschampsia cespitosa*, Compact Rush *Juncus conglomeratus*, Hard Rush *J. inflexus*, Jointed Rush *J. articulatus* and a small quantity of Oval Sedge *Carex leporina*.

The visit was concluded with a circuit of the village and a field path which returned us to the ponds. This supplemented our list with over 70 additional taxa, mostly garden escapes and weeds of cultivation. Hart's-tongue *Asplenium scolopendrium* and Wall-rue *Asplenium ruta-muraria* were particularly welcome records but the intensely arable nature of the land and the heavy use of herbicides limited the latter category. In all we recorded 226 different vascular plants within an area not exceeding one square kilometre, a good total for this part of the vice-county.

ENTOMOLOGY (Roy Crossley)

The Circular (No.902 – Naturalist 142:73-74) for this meeting noted that Dave Chesmore has recorded Lepidoptera at the site for 10 years and more than 270 moths have been recorded in that time, plus about 20 species of butterflies; these have all been within the boundaries of the Eastrington Local Nature Reserve. However, on the occasion of our visit the opportunity was taken to search the adjoining flower-rich meadow, and the species-list for the day which follows incorporates records contributed from both places and from several contributors:- Six-spot Burnet *Zygaena filipendulae*, Small Skipper, Large Skipper, Large White, Small White, Green-veined White, Speckled Wood, Ringlet, Meadow Brown, Gatekeeper, Red Admiral, Small Tortoiseshell, Comma, Small Copper, Shaded Broad-bar *Scotopteryx chenopodiata*, Yellow Shell *Camptogramma bilineata*, Clouded Border *Lomaspilis marginata* (see Plate 8, centre pages), Yellow-tail *Euproctis similis*, Cinnabar *Tyria jacobaeae*, Buff Footman *Eilema depressa* and Silver Y *Autographa gamma*. (After the meeting Terry Crawford and Adrian Norris visited an area about 1km east of the village and found Blackneck moth *Lygephila pastinum* which is scarce and local, although recently spreading and worthy of note in the middle of a fairly large area in VC61 where it has not been recorded previously.)

David Chesmore used pheromone traps to search for Yellow-legged Clearwing *Synanthedon vespiformis* (ex oaks); Six-belted Clearwing *Bembecia ichneumoniformis* (ex Bird's-foot Trefoil); Red-tipped Clearwing *S. formicaeformis* (ex willows), but none was found. He noted the rose leaf-rolling sawfly *Blennocampa phyllocolpa* to be numerous on the disused railway line, and several galls of the sawfly *Proxima bridgmanii* on willow. At the meeting I exhibited the Birch Sawfly *Cimbex femoratus* det. D. Chesmore, which he had found at the Reserve some weeks earlier. He also showed a specimen of the tiny Woundwort Shieldbug *Eysarcoris venustissimus* (det. Stuart Foster, YNU Recorder for Hemiptera), of which he had seen three specimens at the Reserve in the spring, including a pair *in cop*. The large Green Shieldbug *Palomena prasina*

was seen in the flower-rich meadow adjoining the Reserve, as were examples of the mirid bug *Deraeocoris ruber* in several colour manifestations.

I have undertaken some Diptera recording at the Reserve this year, chiefly to add species for this under-worked 10km square to the national Dolichopodidae recording scheme. However, I have looked only at the adjacent meadow on this occasion. The common narrow-bodied yellow and black-banded hoverfly *Episyrphus balteatus* was abundant at flowers everywhere – those with a passion for the invention of vernacular names for invertebrates will be interested to learn that it is now known as 'The Marmalade Hoverfly' which, for those of us oldies who deplore this growing phenomenon, does at least have the merit of being more witty than most! The large 'drone-fly' *Eristalis pertinax* was also prominent. Other hoverflies noted were *Melanostoma scalare* and *Platycheirus clypeatus*, both of which are very common almost everywhere. The conopid-fly *Sicus ferrugineus* was seen in the meadow and Peter Tannett showed me a specimen of a '*Conops*' (probably *quadrifasciatus*), which maddeningly I allowed to escape from its container when I tried to get a better look at it.

I am obliged to Terry Crawford for help in the preparation of this note, and to David Chesmore for additional information.

ODONATA (Richard Shillaker)
Only adult dragonflies were recorded. No exuviae were noted on cursory examination of emergent vegetation and no pond dipping for larvae was undertaken.

Main pond: most sightings were made on the sunny north and east sides of the pond. Four-spotted Chasers *Libellula quadrimaculata* and male Black-tailed Skimmers *Orthetrum cancellatum* were frequently seen. A pair of Four-spotted Chasers was seen flying *in cop* over the pond and another female showed egg laying behaviour. Male Black-tailed Skimmers often rested on the fishing platforms and surrounding open areas around the edge of the pond but no females were positively identified. At least one Emperor Dragonfly *Anax imperator* and one Brown Hawker *Aeshna grandis* were noted; there were probably more individuals but numbers were not recorded. Three species of damselfly were seen: Blue-tailed (see Plate 8, centre pages) *Ischnura elegans* (a pair was seen *in cop*), Common Blue *Enallagma cyathigerum* and Azure *Coenagrion puella,* but only in very low numbers. The low number of damselflies was probably associated with the apparent lack of submerged aquatic vegetation where their aquatic larvae could live. The absence of any sightings of Red-eyed Damselflies *Erythromma najas*, that like to settle on floating vegetation away from the shoreline, might be related to the lack of water lilies and Broad-leaved Pondweed *Potamogeton natans*, although there were numerous patches of floating water milfoil.

Small pond immediately to the south of main pond: this triangular pond did not seem attractive to Odonata probably because it was shaded by trees on two sides and had an extensive algal scum which suggested poor water quality. A single Four-spotted Chaser was twice seen flying along the edge of this pond.

Railway trail: A Southern Hawker *Aeshna cyanea,* photographed by Ken White, settled on vegetation beside the path and another two hawkers were seen by him along the trail. The

ponds beside the trail were not properly investigated.
Meadow: two Common Darters *Sympetrum striolatum* were reported by another observer.

MOLLUSCS (Adrian Norris and Terry Crawford)
The Eastrington Ponds Local Nature Reserve had a limited molluscan fauna but what did occur was interesting, particularly with regard to the freshwater molluscs with some introductions within the fauna such as the Acute Bladder Snail *Physella acuta*, a common snail of aquariums which often gets introduced into the wild, where it can multiply very quickly. As might be expected in such a local nature reserve, other introduced land snails also occurred, including the so-called Green Cellar Slug or Irish Yellow Slug *Limacus maculatus* and the now very common Tramp Slug *Deroceras invadens* which was only separated as a distinct species in 2014, although it was first recorded back in the 1930s; prior to 2014 it was known as *Deroceras panomitanum,* which is now a separate species in its own right. On a lighter and perhaps more positive note we were pleased to find the Flat Valve Snail *Valvata cristata* within the site as this snail has been losing ground due to water pollution in many places; it requires well-oxygenated clean water and emergent vegetation.

FRESHWATER BIOLOGY (Richard Shillaker)
Large pond: in order to assess the quality of the water in this pond, the concentration of nitrate-N and phosphate-P was measured using a simple kit provided by the Freshwater Habitats Trust. Both of these chemical entities gave the lowest reading on their respective scales, i.e. nitrate-N less than 0.2 ppm and phosphate-P less than 0.02 ppm. These findings indicate good quality water in terms of containing low levels of two key nutrients but water samples at other times of the year would be needed to confirm this. This pond, unlike others on the Reserve, did not have an unwelcome algal scum and dense mats of duckweed.

Although these data suggest that the main pond had good quality water in terms of not encouraging excess algal and plant growth, there was a notable absence of pond skaters and whirligig beetles from the pond surface.

BIRDS (Ken White)
Bird species recorded during the day totalled 39, the high number reflecting the broad range of habitats present. Highlights were a Kestrel with young and a Kingfisher. Good evidence of breeding was obtained with fledglings observed of Long-tailed Tit, Robin, Blackbird, Magpie, Mallard, Moorhen, Coot, Starling, Great Tit, Blue Tit, Carrion Crow, Goldfinch and Jackdaw. Probable breeding was indicated by agitated behaviour in Bullfinch, Chiffchaff and Great Spotted Woodpecker, while possible breeding was indicated by singing Wren, Woodpigeon, Blackcap, Chaffinch, Coal Tit, Dunnock, Willow Warbler, Reed Bunting, Goldcrest and Greenfinch.

Saltburn (VC62) 22 July 2017

INTRODUCTION (Tony Wardhaugh)
In spite of rain being forecast the day was largely dry and sunny. Nine members from 10 affiliated societies attended the meeting. In addition, the Marine and Coastal Section visited Saltburn Scar during low tide, which was at approximately 09:45. Moth traps were run in Saltburn Gill during the night before. On the day visits were made to Saltburn Valley Gardens, Rifts Wood, Saltburn Gill Reserve SSSI, Saltburn foreshore and the clay cliffs. Thanks are due to Tees Valley Wildlife Trust for permission to visit Saltburn Gill Reserve.

FUNGI
The only fungi noted by the group were Jelly Ear *Auricularia auricula-judae*, a bracket fungus *Ganoderma* sp. and Dead Man's Fingers *Xylaria* sp., all in Rifts Wood.

FLOWERING PLANTS (Wendy English, Paul and Joyce Simmons)
Fourteen strand-line plants were recorded, very largely in NZ6621. Of these, Sea Rocket *Cakile maritima* is on the VC62 rare plants register; it has been recorded here previously in 2012. Other plants were coastal specialists, including Frosted Orache *Atriplex laciniata*, Sea Sandwort *Honckenya peploides,* Sea Mayweed *Tripleurospermum maritimum* and grasses such as Marram *Ammophila arenaria*, Lyme Grass *Leymus arenarius,* Sea Couch *Elitrigia juncea* and Sea Fern *Catapodium marinum.* All the plants have been recorded previously for the BSBI in this tetrad since 2000 except Sea Sandwort and Curled Dock *Rumex crispus*.

The lower part of Saltburn Gill is a very human-manipulated landscape and the plants found growing there were common and widespread, perhaps the most interesting being Sweet Cicely *Myrrhis odorata* and Hemp-agrimony *Eupatorium cannabinum.* A native of Mediterranean areas, Winter Heliotrope *Petasites fragrans,* has become established by the stream in a well shaded area. Its native relative Butterbur *P. hybridus* was also present.

A walk along the beach to the boulder-clay cliffs as rain arrived yielded the following:
Rest-harrow *Ononis repens*, Sea Plantain *Plantago maritima*, Coltsfoot *Tussilago farfara*, Wild Carrot *Daucus carota* and Bird's-foot-trefoil *Lotus corniculatus.*

By the Cleveland way footpath the following were noted: Duke of Argyll's Tea-tree *Lycium barbarum*, Carline Thistle *Carlina vulgaris*, Tansy *Tanacetum vulgare*, Harebell *Campanula rotundifolia* and Goldenrod *Solidago virgaurea*.

PLANT GALLS (Wendy English)
Galls formed by the aphid *Hayhurstia atriplicis* were found on orache, almost certainly Spear-leaved Orache *Atriplex prostrata*. Only one affected plant was noted, this on the strand-line (NZ668216).

MARINE AND COASTAL (Paula Lightfoot)
Eight marine and coastal enthusiasts met two hours before the official start of the Excursion to take advantage of the low tide to explore the rocky shore at the base of Hunt Cliff. Although the sea was a chilly 13 degrees, two hardy participants even donned wetsuits and snorkels to record the shallow sub-tidal kelp habitats. It was a thoroughly enjoyable morning, during which

we recorded over 60 species, including seaweeds, sessile fauna such as sponges, anemones, sea squirts and bryozoans and larger mobile animals such as starfish, urchins, crabs and fishes. Some highlights included both UK species of Cowry, Spotted *Trivia monacha* and Arctic *T. arctica*, and the nudibranch *Ancula gibbosa*, which although widespread is rather under-recorded. The non-native sea squirt *Corella eumyota* had been recorded on previous visits to this shore and was again found on the underside of several boulders, but not in large numbers.

LEPIDOPTERA - Nocturnal Moths (Richard Woods)

Moth traps were operated in Saltburn Gill during the night prior to the main Excursion. Two mercury vapour traps were operated at grid reference NZ670211, along the sheltered main access track into the Reserve which is owned and managed by the Tees Valley Wildlife Trust. The trap site chosen was within an area of mixed deciduous woodland with Ash, oaks, Sycamore *Acer pseudoplatanus*, Wych Elm *Ulmus glabra* and a well-developed understorey comprising mainly of Blackthorn, bramble *Rubus fruticosus* agg., Hawthorn *Crataegus monogyna* and Hazel.

Weather conditions stayed dry and warm during the five hours that recording took place and the location was sheltered from the strong wind which affected areas outside of the Gill. Commensurate with the favourable weather conditions it is pleasing to report that 80 moth species were assembled to the MV lights, comprising a suite of typical woodland moths. The most notable, all of which were recorded on the basis of single examples, were:

- Blomer's Rivulet *Discoloxia blomeri* – In Yorkshire, this scarce moth has its headquarters in VC62 and it has been previously reported from the Saltburn Gill site in 1987 by Peter Waterton. The larva feeds on Wych Elm.
- Clouded Brindle *Apamea epomidion* – Thinly distributed across Yorkshire. This woodland moth uses various grasses as larval food plants.
- *Coleophora lutipennella* – This micro-moth, which uses oaks, is uncommon in Yorkshire. There have previously been only two records of this diminutive microlepidopteran from VC62.
- Double Lobed *Lateroligia ophiogramma* – This is associated with damp woodland where it uses grasses such as Reed Canary-grass *Phalaris arundinacea.*
- Large Twin-spot Carpet *Xanthorhoe quadrifasiata* – An uncommon moth in VC62, the larvae use a range of herbaceous plants.
- Pinion-streaked Snout *Schrankia costaestrigalis* – Another moth of damp situations. Once again, fairly local.

In addition to those noted above, it was generally pleasing to see a reasonable abundance of moths, with around 250 individuals arriving at the lights. The results are indicative of a woodland that is in a good ecological condition.

LEPIDOPTERA - Diurnal (Terry Crawford)

We first investigated the Skelton Beck valley. The weather was poor for butterflies and daytime moths, being generally overcast and turning to heavy rain by late morning. In the lower amenity grassland and parkland area there were a few Large, Small and Green-veined Whites. Under these circumstances, the highlight was a very small *Buddleja* with only a couple of inflorescences growing against the wall of the miniature railway engine shed, which was providing a nectar source for no fewer than five Red Admiral. The occasional *Agriphila straminella* (a small crambid grass moth) was disturbed into flight. No Lepidoptera were noted in the higher wooded areas

of the valley. In the afternoon we briefly visited the Saltburn Gill Nature Reserve. Again, a few white butterflies were seen and, with the improved sunny conditions plus the broken canopy of mainly broadleaved woodland, we were able to observe several male Speckled Wood defending their sun-spot territories.

The group also noted Meadow Brown and Ringlet elsewhere during the day.

COLEOPTERA
The only beetle noted was the Black-tipped Soldier Beetle *Rhagonycha fulva*, in Saltburn Valley Gardens.

OTHER ARTHROPODS (Tony Wardhaugh)
A litter sample from Rifts Wood (NZ664207) contained four common millipedes: *Cylindroiulus punctatus*, *Julus scandinavius*, very many *Cylindroiulus britannicus* and one juvenile *Proteroiulus fuscus*. Also present in the sample were the harvestman *Nemastoma bimaculatum*, the woodlouse *Trichoniscus pusillus* and a pseudoscorpion, the Common Chthonid *Chthonius ischnocheles*. The millipedes *Cylindroiulus britannicus* and *Ophyiulus pilosus* were noted in Saltburn Valley Gardens (NZ667213).

MOLLUSCS (Adrian Norris and Tony Wardhaugh)
Four 1km squares were visited (NZ6620, NZ6621, NZ6720, NZ6721) in the Saltburn Valley Gardens, Rifts Wood and Saltburn Gill areas, with 39 records made during the day and a total of 23 species noted. Even though this area has been well recorded in the past there were two new findings. The Durham Slug (Green-soled Slug or Spanish Stealth Slug) *Arion flagellus* was found in Rifts Wood at NZ664208. This slug is obviously spreading within the area quite rapidly. The other newly recorded mollusc, also spreading within the area, is the Glossy Glass Snail *Oxychilus navarricus helveticus*. This proved to be abundant throughout Rifts Wood. Other more local ones included the Toothless Chrysalis Snail *Columella edentula* (NZ6620) in Rifts Wood and the Plaited Door Snail *Cochlodina laminata,* which occurred in Saltburn Gill (NZ6720). At over 50 the total number of known species for the area is high and thus we recorded less than half of these during the day.

VERTEBRATES
The group noted Common Frog and two Smooth Newts in Saltburn Valley Gardens, the latter at NZ6643.2046.

The following birds were seen during the day: Blackbird, Black-headed Gull, Bullfinch, Carrion Crow, Dunnock, Goldfinch, House Martin, Kittiwake, Linnet, Magpie, Mistle Thrush, Robin, Swallow and Wood Pigeon.

The only evidence of mammals was the presence of a number of Mole hills in Saltburn Valley Gardens.

CONSERVATION
The group noted the presence of much Himalayan Balsam *Impatiens glandulifera* in Saltburn Valley Gardens. Any attempt to control the spread of this most invasive plant would be beneficial. Vegetation at the base of numerous fence posts and in other similar places was

dead, indicating the use of a broad-based herbicide. The group wonders why this treatment is necessary.

It was gratifying to note the clarity of water in Saltburn Gill following extensive work to reduce iron oxide pollution that has occurred in the past.

Dunford Bridge (VC63) 19 August 2017

INTRODUCTION (Joyce Simmons)
This was a joint meeting with Sorby Natural History Society (see Plate 9, centre pages) to look at the moorland habitat as well as the unusual limestone site of Wogden Foot, now a Nature Reserve, along the Trans-Pennine Trail (TPT).

The TPT crosses typical Millstone Grit moorland at Dunford Bridge, running beside the young River Don at this point. Heather moorland can be found close to the Trail but exploration of this habitat was limited due to the inclement weather. Unfortunately, the sunshine in the lowlands was not visible on the Moors and the 29 brave members who attended were greeted by steady falling rain which only gave us brief respite in the morning. Late afternoon was much brighter, but by then the number of attendees had fallen to 13.

The previous evening was fine, which enabled Derek Whiteley, who stayed all night, to amass some interesting records. 45khz Pipistrelle bats over the river and Whiskered or Brandt's bats along the trail were seen hunting. Derek also saw a Mountain Hare in brown pelage.

On Saturday morning we met in the car park of the TPT and from there a small band headed for the high moor, hoping to find caddis fly larvae below a waterfall on the embryonic River Don, though this aim was not realised. However Cloudberry *Rubus chamaemorus* and two more Mountain Hares were seen as well as a few invertebrates. Most people headed for the Wogden Foot Reserve but invertebrates were also rather sparse there, as the incessant rain reduced flying activity. Other groups had some success. Three new molluscs were added to the 10km square list, several plant galls were recorded, but the greatest number of records were for bryophytes, the damp climate being very suitable for their growth.

The indoor meeting was held in the Wagon and Horses public house at Langsett, where the day's findings were discussed and it was generally agreed that, despite the weather, it had been an interesting location and a successful meeting.

It seems probable that the area covered by this Excursion will soon suffer disruption as National Grid has obtained funding to bury the overhead electricity cables which at the moment are on pylons. They will be buried under the TPT but come to the surface in the Wogden Foot Reserve. It seems very likely that planning permission will be granted and mitigation is being sought. It is hoped that vulnerable species, such as the Willow Tit which breeds by the trail, will be considered in the work schedule.

My thanks to Derek Whiteley and Roger Butterfield of Sorby Natural History Society and Trevor Mayne, Barnsley Biodiversity Officer, for their help in arranging this very well-attended joint

meeting. I hope that future joint meetings are blessed with rather better weather.

BRYOPHYTES (Tom Blockeel)

Bryophytes were recorded mainly along the TPT but also in a small stream gully on the moorland edge, centred on SE166023. The most notable feature of the Trail was the rich growth of epiphytes in the linear woodland along its edges, especially (but not only) on sallows. They included all the usual bryophytes that we now expect to find following the recovery of epiphytes over the past two decades, with a notable abundance of *Orthotrichum pulchellum*. The moss *Pylaisia polyantha* was noteworthy in its second locality in VC63, though it is doubtless somewhat under-recorded. It has increased widely in nearby Derbyshire and is now locally frequent there. Several tufts of *Ulota calvescens* were noted on sallows. Only five years ago, this was thought to be a hyper-oceanic moss and it was almost unknown in England, until it was found by Johnny Turner at Hebden Bridge in 2013. Once its presence was recognised, it was found to be widespread in the South Pennines and scattered elsewhere in England. Among the other epiphytes recorded were *Orthotrichum lyellii*, *Sanionia uncinata*, *Ulota crispa* s.str. and *U. intermedia* (the latter recently reinstated as a distinct species). The flora of terrestrial habitats along the Trail consisted mainly of common bryophytes, including *Eurhynchium striatum* under trees and *Rhynchostegium murale* on the shaded wall. A *Didymodon* on soil at the edge of the track proved to be the species traditionally known as *D. acutus* but correctly called *D. icmadophilus*. It is a scarce moss but has been turning up more widely in ruderal habitats in recent years. The grassland in the old sidings at Wogden Bottom was too dense for most bryophytes but there were a few calcicoles, including *Ctenidium molluscum* in small quantity and *Fissidens adianthoides*. *Drepanocladus aduncus* was present in a wet hollow and *Rhytidiadelphus loreus* on one of the scrubby mounds. The stream gully running into the moorland north of the Trail added *Hyocomium armoricum* on boulders at the stream edge and *Jungermannia pumila* on wet grit rock by a small waterfall. There was a slump on a steep shale bank and the exposed ground supported *Didymodon tophaceus*, *Dicranella varia*, *Pohlia wahlenbergii* and *Pellia endiviifolia*. A flush with Marsh Pennywort *Hydrocotyle vulgaris* at the top of this bank was notable for a good population of *Plagiomnium ellipticum*, only the second recent record in VC63. Several *Sphagnum* species occurred on the banks of the gully, including *S. russowii*.

All the sites were in tetrad SE10R and the total number of bryophytes recorded was 84.

FLOWERING PLANTS (Louise Hill)

Despite the rather inclement weather, the botanical group managed to make a few worthwhile discoveries/re-discoveries along the TPT and the Wogden Foot Reserve. The latter was a siding when the railway was open where large amounts of limestone used as hardcore and ballast, scraped from the railway lines, was dumped. The result now is an interesting mosaic of flora and invertebrates dependent on the basic soils which have developed. It is grazed by sheep, which had eaten many of the flower heads at the time of our visit, so identification was often of vegetative parts. Nevertheless, some interesting plants were found; a single Clustered Bellflower *Campanula glomerata* (not previously recorded) and Ploughman's Spikenard *Inula conyzae* (last recorded 2010) were seen.

Our recording efforts concentrated on the SE10R Tetrad (1km squares SE1602 and SE1702) for which my BSBI Atlas 2020 database already holds records of 249 species. The first chance

discovery was a small colony of Slender Rush *Juncus tenuis* growing in a waterlogged rut just off the edge of the surfaced TPT at SE16520242 (a colony whose continued existence on this site may be affected by the proposals to bury high voltage power lines underground along this section of the Trail).

The Native Goldenrod *Solidago virgaurea* was also growing on the stonework of a shaded wall beside the TPT at SE171026, mistakenly taken to be a ragwort when viewed at a distance through the rain! Another nice record was a large patch of Jacob's-ladder *Polemonium caeruleum* found within the sheep-grazed section of the Wogden site at SE17610260, a plant reportedly not seen on this site since 1992 (according to the BSBI's database). Presumably the regular grazing by sheep has prevented its flowering, meaning it has been overlooked in the hidden hollow in which it is growing.

Several large areas of Soapwort *Saponaria officinalis* were also re-found in SE179026. This is a plant suspected to have been found during a visit by the South Yorkshire Botany group in 2015 but whose identification had not been verified during that visit.

Other previously-unrecorded plants included Pendulous Sedge *Carex pendula*, False Fox Sedge *C. otrubae*, Marsh Woundwort *Stachys palustris*, Opposite-leaved Golden Saxifrage *Chrysosplenium oppositifolium*, Hemlock Water-dropwort *Oenanthe crocata*, Butterbur *Petasites hybridus* (actually found in SE1803) and Reed Canary-grass *Phalaris arundinacea*. Many of these were found on a narrow, boggy, floodplain beside the River Don at SE179026, accessed via a very steep slope of loose clinker and on the opposite side of two barbed wire fences, no doubt the reason why these plants have not previously been recorded at this site. The north-facing clinker slope is lightly wooded with many fallen rotting branches and damp leaf litter in amongst which grows Narrow Buckler Fern *Dryopteris carthusiana*, another new record for this location.

During his bryological foray on a side stream south of the TPT (SE166024), Tom Blockeel also found Star Sedge *Carex echinata* and Marsh Violet *Viola palustris,* both additions to the Atlas 2020 list for the Tetrad. On his walk around the moors above Winscar Reservoir, Derek Whiteley also located acidic flushes with several hundred spikes of Bog Asphodel *Narthecium ossifragum* as well as Cloudberry *Rumus chamaemorus* and Marsh Pennywort, all previously known from this area but which are always nice to find.

PLANT GALLS (Tom Higginbottom)

The oaks in the TPT car park were host to a variety of galls caused by gall wasps. The common spangle galls *Neuroterus quercusbaccarum* and *N.numismalis* were frequently seen on the leaves and the Knopper Gall, *Andricus quercuscalicis* had galled some of the acorns. The Artichoke Gall was seen on some oak buds but it was the Ramshorn Gall *A. aries* which was an exciting find. This gall first appeared in S.E. England in 1997. It is now common in woodlands to the south of VC63, in the Doncaster area, but it was good to record it further north. An even more unusual gall was one of the currant galls *Cynips divisa*. In recent years the *Cynips* species have been uncommon.

Around the car park were the native Alder and Grey Alder. The female catkins of both were host to the reddish tongue-like growths of the fungal galler Alder Tongue *Taphrina alni* (see

Plate 9, centre pages). An occasional leaf of the native tree had been enlarged by another fungus galler, *T. tosquinetii* which can enlarge the leaf to almost twice its size, with incurved blister-like shapes on both surfaces.

There were many sallows in the Wogden Foot Nature Reserve but, although there are many gall causers usually recorded on sallows, there were only two records of the sawfly galls *Eupontania pedunculi*. *Centaurea nigra* is occasionally referred to as Hardhead. I wonder if this may link with the gall found in some of the flower heads caused by the fly *Urophora jaceana,*which is discovered by pressing the flower heads until a hard rounded mass is discovered. A few examples were discovered in the grassland. Common Ragwort was growing beside the pathways, some of their flower heads were swollen and when examined, the creamy white larvae of the midge galler *Contarinia jacobeaea* were found. Swollen flower buds were also discovered on a hawkweed, possibly *Hieracium umbellatum;* larvae of another fly galler *Noeeta pupillata* were found in the flower buds.

In poor conditions 30 galls were recorded, indicating a site worthy of future explorations.

LEPIDOPTERA (Paul Simmons)

The poor weather on the day of the excursion made it unlikely that we would find many insects of any type, and so it was not surprising that the Lepidoptera list was a short one. The worst of the rain had passed by lunchtime and, during brief brighter intervals, small numbers of Small Heath and Small Copper butterflies appeared; Green-veined Whites were seen on the moorland, as was a Silver Y Moth.

During a reconnoitring visit three weeks earlier, a more representative sample of the butterflies and day-flying moths of the area was found. Again there were Small Heath and Green-veined White but there were also good numbers of Ringlets, Gatekeepers and Meadow Browns, together with a Large Skipper. The grass moth *Agriphila straminella* was plentiful, and unsurprisingly the birch-feeding micro-moth *Argyresthia geodartella* was easy to find. Day-flying macro-moths were also seen - Common Carpet *Epirrhoe alternata*, Latticed Heath *Chiasma clathrata* and, more notably, Northern Spinach *Eulithis populata*. The larvae of the last one feed on Bilberry *Vaccinium myrtilus* and the adults are easily disturbed and will fly in relatively poor light, as well as at dusk.

MOLLUSCS (Adrian Norris)

Three members of the section attended the meeting, with Prof. Richard Cameron sampling material along with Terry Crawford and myself.

18 species of slugs and snails were found within the nature reserve at Wogden Foot (SE174026). Three were new to the 10km square (SE10): the Ash-grey Slug *Limax cinereoniger* is a slug of old or ancient woodland whilst the Budapest Keeled Slug *Tandonia budapestensis* is a fairly common pest in gardens and disturbed areas close to habitation, and the Milky Crystal Snail, *Vitrea contracta* is more typical of mixed woodland, and is perhaps the most catholic of the three. The finding of two sub-adult specimens of the Ash-grey Slug is perhaps the most outstanding find for the area for very many years.

YNU Notice: Membership subscriptions

A gentle reminder that subscriptions for 2018 become due on 1 January. Rates have not changed and are currently:

Single members £25 per annum
Joint/Family Members £30 per annum (all family members at one address)
Low Income £20 per annum
Students £15 per annum

Payments should be made to:

Membership Secretary, Clare Langrick, NEYEDC, 10a Minster Gates, York, YO1 7HL
email: membership@ynu.org.uk

Please make cheques payable to 'Yorkshire Naturalists' Union'. If you would like to pay by standing order please contact Clare to arrange this. Members can also renew online at www.ynu.org.uk/membership.

Erratum

Please find below the corrected second paragraph of the discussion in Archer, M. (2017) Gains and losses of species abundances of bees of Watsonian Yorkshire. *The Naturalist*, 142: 47.

Treating the extinct species as losses and the new, relatively new and rediscovered species as gains this gives a total 42 species as losses to the 49 species as gains. There are also 29 stable species. This would seem to indicate although the actual species present in Yorkshire are variable over the longer time, the number of species remains relatively constant.

Retraction: An unusual Tansy *Tanacetum vulgare* plant at Newton-on-Ouse, North Yorkshire

Geoff Oxford Department of Biology, University of York
Email: geoff.oxford@york.ac.uk

A short note was published in *The Naturalist* in 2016 (141: 58-60) describing a plant found growing adjacent to a Tansy *Tanacetum vulgare* clump near Newton-on-Ouse, North Yorkshire. It was described as a mutant form of Tansy. Embarrassingly it turns out that the plant was in fact a species of *Anthemis*, a garden escape. The Yorkshire Museum has been informed and asked to destroy the herbarium material derived from this plant. I thank John Grimshaw (Yorkshire Arboretum) for correctly identifying the plant.

YNU Calendar 2018

Events up to the August are shown below. Up-to-date information and further details can be found at www.ynu.org.uk/events, and the YNU Membership Card.

Feb	3	Natural Science Forum. St Chad's Parish Church Centre, Leeds. 10:30 to 12:30.
	24	South Yorkshire Natural History Day. Treeton Miners Welfare Club, Treeton, Rotherham from 10:30. The theme is "What's going on in South Yorkshire".
Mar	3	Entomological Section's Recorders' Reports and Conversazione, Wilberfoss Community Centre. 10:30-16:30.
	11	Conchological Section Indoor meeting, Marton, Middlesbrough. Contact Adrian Norris (0113 2745244) for details.
Apr	1	Marine & Coastal Section meeting at Saltwick Bay, Whitby. Meet at 10:00 in car park off Hawsker Lane NZ915107.
	4-11	The Spring Meeting of the British Bryological Society will be held in Swaledale. For further information see YNU Membership Card.
	7	**YNU Conference and Exhibition** Ron Cook Hub, University of York. See p214 for details.
	14	Conchological Section Ripon Parks SSSI. Meet at 11:00 at SE300756.
	28	Botanical Section meeting at Bishop Wood, Selby. Meet at 10:30 off Scalm Lane at SE560332. Joint meeting with Bradford Botany Group.
May	5	Conchological Section Leavening Brow VC61. Meet at 11:00 at SE79446320.
	5	Bryological Society meeting at Anston Stones Wood (VC63). Meet at 10:00 in lay-by on A57 at SK536828.
	10	Entomological Section meeting at Blackmoorfoot Reservoir. Meet at 10:30 at SE099123 on south bank.
	19	**VC63 South West Yorkshire Excursion to Thorne Moors** (SE75511714)
	19	Marine & Coastal Section meeting at Thornwick Bay, Flamborough. Meet at 12:00 in the car park (TA233719) before the cafe car park.
	25	Entomological Section meeting at Rushy Moor and Shirley Pool SSSI, Askern. Joint meeting with Botanical Section (see below).
	25	Botanical Section meeting at Rushy Moor and Shirley Pool SSSI. Meet at 10:00. Car parking on private land at Sutton Common by permission of Carstairs Countryside Trust. Access from A19 at SE557123. Contact Louise Hill (01302 322956) if you are planning to attend.
June	2	Entomological Section meeting at Birch Wood YWT reserve, Bilsdale. Meet at 10:30 at SE56969201. See Membership Card for further info.
	9	Conchological Section joint meeting with YNU Freshwater Ecology Section. Gayle Beck and Aysgill Force. See below for details.
	9	Freshwater Ecology Section meeting at Gayle Beck and Aysgill Force. Meet at 10:30 at Gayle Lane car park, Hawes SD870897.
	23	**VC64 Mid West Yorkshire Excursion to Swarth Moor** (SD810694)
	30	Botanical Section meeting at Gypsy Marsh, Dearne Valley. Meet at 10:30 in car park at SE419024.
July	7	**VC65 North West Yorkshire Excursion to Dent** (SD679861)
	14-15	**VC61 South East Yorkshire Excursion to Spurn Point** (TA416154)
	15	Marine & Coastal Section meeting at Filey Brigg. Meet at 11:00 in car park (fee) next to Sealife Centre TA035907.
Aug	18	**VC62 North East Yorkshire Excursion to Sutton Bank** (SE516830)
Nov	3	**YNU AGM** St Chad's Parish Centre, Otley Road, Far Headingley, Leeds, LS16 5JT